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ABSTRACT

This final four-part report describes and evaluates the Vocational Adult Secondary Training Project (VAST) whose goals were to revise and develop: adult basic education curriculum in the areas of mathematics, communications, and science; individualized instruction with clearly defined objectives; a methodology for pretesting and selection of programs suited to the needs of students; the integration of life skills training in the oral communication program; and practice in group projects. Part A describes the program in which a comparison was run between two demonstration classes (implementing the revised curriculum) and regular classes. From pretesting and the final evaluation, based on a Test of Adult Basic Education (TABE), it was found that the demonstration classes progressed in less time than the regular classes. Enumerated conclusions and recommendations focus on the mechanics of the program. The student and instructor manuals; student opinion and learning resource surveys; sample units in mathematics, science, and communications; a list of required commercial learning resources; and statistical data are appended. Parts B, C, and D offer respectively the mathematics, communications, and science curriculum guides included contain individual lessons complete with objectives, procedures, suggested resources, and pretesting and testing forms. (JB)

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FINAL REPORT

VAST Development Project

Phase I

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CE003 369

B. T. S. D. ADVISORY COMMITTEE - S. P. #72-56

Final Report on the Development Phase of this Project Which Ran From September 1, 1972 until August 31, 1973 Under the Sponsorship of the Department of Manpower and Immigration and the Special Projects Branch of the British Columbia Department of Education.

I Introduction

This report attempts to describe in section II and evaluate in section III the progress to date of a Vocational Adult Secondary Training Project (V. A. S. T.). The limitations of testing instruments as well as the small number of students participants make it difficult to formulate concrete conclusions. Nevertheless, the report should serve as a decision-making base for further development and experimentation.

II The Vocational Adult Secondary Training Project (V. A. S. T.)

1. Background

The V. A. S. T. project was proposed as a developmental project in response to an invitation by the Department of Manpower and Immigration in 1972 to assist British Columbia in applying some of the methodology in adult basic education that had been developed by the various Newstart Corporations. It had been the intention of the B. C. Department of Education to engage in some curriculum revision. Hence, the Department seized this opportunity to adapt to the B. C. program the curriculum development ideas, the new methodologies in adult basic education, the new teaching materials that had been developed by particularly Nova Scotia and Saskatchewan Newstart Corporations, and some ideas developed elsewhere in North America.

The objectives of the project were:

(a) to determine the value to both teachers and students of:

(i) a curriculum developed in modular units for individualized instruction towards clearly defined behavioral objectives.

(ii) a methodology which provided for pre-testing and selection of a program to meet each student's needs and allow him to proceed at a rate best suited to his abilities.

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(iii) an integration of life skills training into the program in oral communications and practice in some group projects.

(b) to adapt and develop curriculum and teaching materials for levels II and III B. T. S. D. in British Columbia.

It was hoped that in a 12-month period the program could be put together and given an initial test with two continuous entry classes.

2. Methodologies

In order to establish whether or not this new program was of increased value to the student and/or the teacher, a comparison was made. Students taking the new program were put into two "demonstration" classes and their progress compared with students in regular or "comparison" classes.

(a) Demonstration Group

The methodologies specifically chosen in advance to be demonstrated included:

(i) pre-testing students to determine their academic level of functioning,

(ii) having students select required units of work from a modular curriculum, guided by results of pre-testing, vocational goals, and individual capabilities,

(iii) having students proceed through the program at their own rate,

(iv) integrating Life Skills into the Science and Communications parts of the program.

In addition, the staff of the project introduced some additional factors in methodology during the research and development stage of the project. These factors reflected the philosophy that a course of this nature should be student centred, and should attempt to meet some social and learning needs of the disadvantaged adult student. Methodologies developed towards these ends included:

(i) having students plan and schedule their own study program,

(ii) requiring a student to learn how to work effectively as a member of a small group,

(iii) having a student participate actively in large group activities,

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(iv) having students participate actively in classroom and school management decisions,

(v) permitting students to enter and complete the program at times best suited to their individual requirements.

Specific details of how these methodology objectives were attained are included in the Instructor' s Manual (Appendix II), the Student Manual (Appendix I), and sample program units (Appendix III).

(b) Comparison Group

Course content was outlined in chart form in modular units stated in terms of behavioral objectives. The common core was determined in consultation with trade training instructors. Goal-oriented options provided for some individualization of the course content.

The training approach utilized individualized instruction thereby permitting students to work at different levels and rates. Self-instructional materials, self-directing course guides, integrated unit tests, and student progress charts were used. Appropriate audio-visual aids, a reading skill center, and science labs were also integral parts of the program.

The approach to "Life Skills" training was to deal with individual problems on an individual basis as they arose and to discuss common problems with the group. Each student was assigned to an instructor who was his advisor throughout the course. Some of the Life Skills were dealt with in the orientation phase, some in the science course (drugs, alcohol, nutrition, etc.) and some in the communications course (interview techniques, job search, etc.). Written information was made available on the various community services and agencies.

3. Administrative Arrangements, Resources, and Facilities

The project was organized as a "Special Project" within our Special Projects Branch under a Director who was responsible to the Principal of Special Projects. The facilities and personnel of our Curriculum Branch were made available. The demonstration classes and comparison group were under the direction of the Burnaby Vocational School. The comparison group was a random selection of students from various classes in the Burnaby Vocational School.

4. Articulation Between Demonstration and Regular B. T. S. D.

Since the curriculum content of the Special Project classes did not differ greatly from that of regular B. T. S. D. classes, no special arrangements were necessary for trainees proceeding to further training. Just prior to the writing

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of this report, two students proceeded on to a regular level IV-course and were progressing satisfactorily. Another entered Sheet Metal training. Several others had made successful application to enter various vocational courses, but as yet have not actually started training. The great majority of the students who were in the project classes re-entered employment directly on completion of their course.

5. Intake and Exit

(a) Demonstration Group

In the study of Communications and Mathematics, which was completely individualized, continuous entry and completion posed no problem. A student, upon entering classes, began these courses by writing diagnostic tests which lead him to a prescribed series of studies. Regular testing provided feedback to the student, and he proceeded on through those topics which he required, until completion. (See sample Mathematics and Communications Units, Appendix III).

Group studies, however, such as those required in Science and Oral Communications were made more complex by continuous entry. It was quite possible to carry on a planned series of group activities in a continuous entry situation, but it required special preparation and planning on the part of the instructor, and a relevant set of learning resources for the student. Many specific suggestions and procedures were outlined in the Instructor's Manual (Appendix II). A detailed description of the materials used is found elsewhere in this report. Students were provided with guidelines which enabled them to have their groups function effectively. In addition, the self-instructional materials in the Science outline specified group learning activities for the students to follow. (See the Science Sample Unit, Appendix III).

Continuous intake was purposely contrived at the beginning of the project to ensure that it would occur. Initially 13 students were enrolled in one class and 15 in the other. One or two students entered each class each week until the full complement of 18 was reached. Dropouts were replaced within a day or two. Completions were replaced during the first $3\frac{1}{2}$ months of the program. The arrangements for new students were made by the CMC office at the B. C. Vocational School and students were taken at random from their B. T. S. D. waiting list. A total of 63 students utilized the 36 seats of the project.

Initial orientation was done by the instructor. This was handled as informally as possible, with the students being introduced to the instructor, the facilities, and each other during the first day in class. A number of specific activities to help the student successfully re-enter the classroom environment are outlined in the Instructor's Manual (Appendix II).

However it was found in the project that it was difficult to initiate 13 to 15 students effectively into the program at the same time. Half the dropouts were from the original 28 students who started on the first day. These dropouts left within the first three weeks of classes. We felt that if the classes had started with no more than 10 to 12 students, and added more on a continuous entry basis, beginning after $1\frac{1}{2}$ or 2 weeks, an instructor could do a more satisfactory job of introducing students to their new environment, and thereby lower the early dropout rate.

The intake of students singly or in small groups on a continuous entry basis presented few problems. A "buddy system" was developed whereby a host student welcomed the newcomer, and introduced him to classmates, and tried to help with parking, transportation, or any other problems. Parts of the Oral Communications program dealt specifically with the responsibilities of the class and the duties of the host in this respect. The student manual gave some additional guidance to the hosting student. The hosting experience provided the trainee with an opportunity to practice social skills.

Records of progress through the course were kept by each student on his Weekly Study and Achievement Record Sheet (Appendix I). Once a week a new sheet was made out by the student, and the old one placed by the instructor, in the individual student file. This constituted the only record of student achievement. Since the student was competing against no one, and was trying to achieve a criterion of 90 to 100% on all written work, cheating in tests and record keeping rarely occurred, and usually stopped when the offender realized the futility of his actions. His aim was to learn as much as was required to meet the goals which he had set for himself.

Achievement was measured by T. A. B. E. (A Test of Adult Basic Education) which is described elsewhere in this report. The student received a certificate which showed his achievement as a grade equivalent in both English and Arithmetic. Science was reported as an average mark on all tests taken during the course. All Optional Units were listed by title on the student certificate. (A sample certificate is included in the student manual (Appendix I). Letter grades were not used, since they are rather meaningless in an individualized program. It was felt that this type of certificate made it easier for an administrator or potential employer to evaluate the student's achievement in light of the requirements of the institution or organization.

The decision on when to write the final T. A. B. E. examination was usually made by the student in consultation with the instructor. If he considered that he had achieved his immediate learning objective he could ask to write the final. In practice, however, a good deal of planning usually preceded the writing of the final test. In almost every case

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plans were made with the instructor, a CMC counsellor, a vocational school department, or quite often with a prospective employer. Students who failed to reach a necessary standard remained in the class for a further period of study and review.

Phasing out the demonstration classes was a relatively simple matter. Continuous entry was stopped in mid-April, and through normal completions, the regular 36 students were reduced to 11 by the end of June. These people elected to write the final exam rather than transfer to the regular B. T. S. D. class in the B. C. Vocational School. Their final standings were, in general, quite satisfactory.

(b) Comparison Group

Intake took place every fourth week, at which time the course was re-filled to the maximum. Initial number included in the comparison group was 42.

An orientation period of one to three weeks was provided depending on the needs of the student.

On entry, student placement was based on achievement tests (assessment), and by placement tests which were an integral part of the program.

Progress was monitored by unit tests and instructor-student conferences.

Readiness for exit was determined when the student had satisfactorily completed those parts of the program required for his goal.

6. Staff Training

The demonstration staff was selected because of experience in B. T. S. D., Life Skills and Curriculum Development. Arrangements were made for periodic consultation with resource persons from the Department of Manpower and Immigration. An advisory committee consisting of B.T.S.D. Department Heads, the Provincial Co-ordinator, and the Director of Curriculum, Division of Post Secondary Education, and the Department of Manpower and Immigration met frequently with the project staff.

7. Trainees - Selection

Manpower counsellors, after confirming the training needs of a client, applied to the Manpower On-site office for training space in a particular course.

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In the case of B. C. V. S. Burnaby, Manpower counsellors had applied for space in B. T. S. D. courses and a waiting list of potential trainees was developed. This waiting list was utilized on a seniority basis to obtain those trainees enrolled in the V. A. S. T. course.

Thus all the trainees were a random selection and representative of trainees referred to B. T. S. D. at that particular time.

8. Equipment and Materials

The student learning materials were selected on the basis of the following criteria:

(a) The commercially written material had to be suitable for self-instruction--either by individuals or by small groups. Answer books had to be available for all materials used individually.

(b) Materials had to be adult oriented. Books, tapes, and filmstrips could not "talk down" to the student, but at the same time, the language and reading level had to be suitable. With few exceptions the selected materials met these requirements.

(c) Several sources had to be available for study of a single topic. Different materials provided different approaches to learning, which helped meet the varying needs of individual students.

(d) Learning materials had to vary. Books, pamphlets, filmstrips, tapes, sound filmstrips, and laboratory apparatus were among the prescribed resources which provided variety in the students' learning experience.

(e) Audio-visual materials had to be simple. Since all the equipment was to be operated by the students themselves, complex or fragile apparatus was unsuitable. Consequently all audio-visual materials were used in a DuKane projector, which could be utilized as a cassette player, a filmstrip projector, or a combination of both. In addition, adaptations for individual, small group, or large group participation were made.

(f) During the upcoming Phase II V. A. S. T. Project, materials will have to be portable. Since the major use of these materials will be in individual classes in widely separated communities throughout B. C., the final product will have to be packaged and portable. They will consist of a dozen or so cartons of materials and supplies, and a portable laboratory about the size of a table.

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(g) The materials will be self-contained and complete. When used in class, all that will be required is a room suitable for 19 people to work and study in. Everything else will be provided for both the student and the instructor.

III Evaluation Procedures

1. Trainees Learning Ability and Background

A conscious effort was made by the demonstration and comparison staffs to avoid pre-judging students on the basis of past performance. Information on trainees' educational and work experience was obtained by means of a Canada Manpower trainee registration form and a questionnaire. This was supplemented by interview and anecdotal files initiated and maintained by the project staff. The focus of the interviews was on work history and education as well as the personal goals and interests of the trainee.

The Revised Beta Examination was administered to all entrants of the demonstration and comparison classes as a basic measure of their learning abilities. The results indicated comparable learning potential in both groups.

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2. Measured Changes

(a) Educational Gain

The standardized Test of Adult Basic Education (T. A. B. E.) was selected as the basic educational measurement instrument. This test battery, which is essentially an adult version of the widely-used California Achievement Tests, is in three parts: Reading, Language, and Mathematics. It is available in two forms, each in three ascending levels of difficulty, E, M, and D, covering the grades 0-13. Each score is expressed in terms of an equivalent grade.

In appraising available standardized test batteries for measuring educational gain, the T. A. B. E. tests appeared to present overall merits above a number of others, viz., the extensive norming on which the T. A. B. E. tests are based, the favourable experience with them in the recent Atlantic Provinces Demonstration Projects, their acceptable length, and their ease of administration.

The approach to educational gain testing would normally be to use one form of a given level of T. A. B. E. as a pre-test and the other form as a post-test. However, it was realized that most individuals who fell into the upper portion of the M range on the pre-test would have moved into the D range by the time the post-test was administered. Rather than use different forms of the same level, it was decided to measure the pre-course grade equivalency by using the M level, Form 1 test, and to measure the post-course grade equivalency by using the D level, Form 1 test. Results of the educational gain testing are shown below under the appropriate headings:

GRADE LEVEL ON ENTRY - T.A.B.E. Level M, Form 1

		Demonstration 61 trainees	Comparison 42 trainees	Difference (D - C)
Reading:	range	3.1 - 9.6	5.4 - 9.1	
	mean	7.35	7.59	-.24
	s. d.	1.16	.78	
Arithmetic:	range	5.6 - 8.8	4.9 - 8.4	
	mean	7.50	7.67	-.17
	s. d.	.77	.72	
Language:	range	3.3 - 9.8	3.3 - 9.0	
	mean	6.82	7.17	-.35
	s. d.	1.18	1.06	
TOTALS:	range	4.1 - 9.9	5.1 - 8.8	
	mean	7.30	7.56	-.26
	s. d.	1.00	.79	

GRADE LEVEL ON EXIT - TABE Level D, Form 1

		Demonstration 51 trainees	Comparison 27 trainees	Difference (D - C)
Reading:	range	6.2 - 12.0	8.3 - 12.3	
	mean	10.26	10.23	.03
	s. d.	1.34	.87	
Arithmetic:	range	6.1 - 12.2	7.4 - 12.5	
	mean	10.03	10.00	.03
	s. d.	1.47	1.26	
Language:	range	5.0 - 13.0	7.0 - 11.7	
	mean	9.75	9.80	-.05
	s. d.	1.50	1.33	
TOTALS:	range	6.5 - 12.3	8.6 - 11.7	
	mean	10.10	10.08	.02
	s. d.	1.26	.90	

GRADE CHANGE - Post-test minus pre-test results

		Demonstration 51 trainees	Comparison 27 trainees	Difference (D - C)
Reading:	range	1.1 - 4.5	1.4 - 4.1	
	mean	2.78	2.67	.11
	s. d.	.74	.72	
Arithmetic:	range	.5 - 3.9	.9 - 4.4	
	mean	2.43	2.33	.10
	s. d.	.92	.92	
Language:	range	.3 - 4.3	-.7 - 4.7	
	mean	2.78	2.77	.01
	s. d.	.79	1.10	
TOTALS:	range	.6 - 3.5	1.8 - 3.8	
	mean	2.65	2.59	.06
	s. d.	.57	.60	

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MEAN RATE OF GAIN IN TERMS OF DAYS PER GRADE

The educational rate of gain in terms of days per grade in each subject matter was calculated for each trainee who was administered both pre-test and post-test. Then a mean gain in days per grade was calculated for both groups in each subject matter, with results as shown below. It must be pointed out that the TOTALS figures are not obtained by averaging the means of the subject matters above them, but by calculating the means of each total battery result for all individuals.

	Demonstration (51 trainees)	Comparison (26 trainees)
Reading	22.29	35.71
Arithmetic	28.22	43.21
Language	23.71	33.69
TOTALS	22.64	34.71

Tests for significance of differences in scores were made. These showed significant difference in level between pre- and post-testing within each group. However, differences in gain between the groups were not significant.

The total possible days of training and the attendance rate for the two groups are indicated below:

Total Possible Days

	Demonstration (63 trainees)	Comparison (42 trainees)
mean	55.57 days	71.43 days
s. d.	25.00	36.56

Attendance Rate

	Demonstration (63 trainees)	Comparison (42 trainees)
mean	.87	.86
s. d.	.13	.09

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The foregoing indicates that the demonstration and the comparison groups achieved very similar levels of gain, and that the V. A. S. T. (demonstration) individuals achieved this gain, on the average, in approximately 22% less time than did the comparison group individuals.

Admittedly, some reservations can be expressed with regards to the accuracy of the testing procedures used in arriving at gain. There is the question of the relationship between program content and test content, as well as the difficulty of correlation between a grade equivalency indicated by Level M and a grade equivalency indicated by Level D. It can nevertheless be assumed that the possible sources of error in the testing procedures would have operated in about the same measure for both groups.

While the reservations mentioned above would call for caution in placing reliance upon results in terms of individuals' scores, it is safe to say that in overall terms, the demonstration group achieved gains approximately equivalent to those of the comparison group in significantly less time.

(b) Attitudinal Changes

In order to assess possible changes in trainee attitude and motivation stemming from the objectives of the Life Skills component of the V. A. S. T. (demonstration) program, the Life Skills Problem Check List (L. S. P. C. L.) and the 16PF Form E were administered to both groups on a pre/post basis. Data from these tests is now awaiting interpretation, and the results will be appended to this report at a later date.

3. Attendance and Dropout Rates

The attendance rates shown under 2 (a) were calculated from the administrative records of the demonstration and comparison groups.

Raw data on premature terminations was obtained from the same source. However, serious problems of definition arose insofar as the forms and causes of termination were concerned. Perhaps a detailed interview study would provide a basis for a judgement on each individual premature termination. Lacking this, the definition of a dropout as one who has left the course without writing examinations would appear reasonable. On that basis, the demonstration and comparison groups compared as follows:

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	Demonstration	Comparison
No. of entrants	63	42
No. of terminations without examinations	12	15
Dropout Rate	19%	36%

4. Subjective Reactions to Demonstration Classes

During the six-month period in which classes were in session, a surprising number of educators came to look at them, to examine the materials, and to chat with students. Most were impressed, but a few were distressed at the informal atmosphere which prevailed. In this environment students were given only as much guidance as was necessary to facilitate learning. The rationale was that by minimizing the amount of teacher guidance students could be more self-directing and therefore perhaps experience more stimulation. As a result observers usually saw a number of learning activities taking place, varying from a group doing experiments in physics to an individual reading a newspaper.

Instructors enjoyed their classes, although it was not an easy task to meet the diverse needs of the students. Due to the informal approach everyone was on a first name basis, and the students were encouraged to regard the instructor as a consultant in the learning process. Mutual respect and friendship grew out of this unique student-instructor relationship. This carried over into after-class hours and instructors were always invited (and attended) social functions arranged by the students.

A serious attempt was made to evaluate the student response to their new experience in education. A 20-question Student Survey was designed and given to each student to fill out when he or she was nearing the end of the program. The results indicated that the methodologies (Part II, 2) and materials (Part II, 9) used in this project had gained a wide degree of acceptance and approval. (A copy of the survey together with the results of the students' responses is given in Appendix IV).

Some changes in opinion were observed as the course progressed. Early graduates expressed some misgivings with the planning sheet (response #17) and with the science program (responses #2 to #5). However, students who participated in the program after the first two months or so expressed a much more favourable opinion of these features. This change, we believe, was brought about by the increasing expertise of the instructors. Teaching people how to plan and carry out a program of work, and how to work positively as members of a group was not easy. As the instructors became more effective in these endeavors, students were more successful, and hence their opinion of these parts of the program was higher.

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Student opinion was also sought regarding the learning materials which were employed. The students were asked to evaluate the learning resources which they had used. Responses could range from 1 (of no use at all) to 5 (very valuable for learning). (A sample of the Learning Resources Survey is included in Appendix V). The results of this survey were a major factor in the decision on whether or not to retain a specific resource within the program. (The final list of commercial learning resources (Appendix VI) reflects the opinions of the students).

5. Costs

The cost estimates of the project were based upon staff salaries, teaching materials, equipment, and printing costs. Working space and classroom space were provided rent free. The new instruction methods did not affect costs. Only to the extent that new methods were proven more efficient (required less time) than traditional methods could costs be considered as lower.

6. Follow-up Studies

The project committee intends to conduct mail surveys of the trainees of the demonstration and comparison groups in late 1973 and again in mid 1974 in order to obtain information on employment history subsequent to the recent training. These surveys would be carried out through normal Department of Manpower and Immigration follow-up procedures with the exception that 100% coverage of the demonstration and comparison individuals would be sought, rather than the normal 25% sample. Results would be communicated to the Advisory Committee on the Developmental Program after each of the proposed two surveys.

7. Communications

The Director of the project was given the opportunity to visit classes in the Vancouver area and to participate in a series of regional in-service conferences of B. T. S. D. instructors. In addition, all B. T. S. D. teachers in the province were kept informed of the progress of the project through a bi-monthly B. T. S. D. bulletin. Also, opportunities were provided for B. T. S. D. instructors from various regions of the province to visit the project. The Department Heads of the two largest B. T. S. D. divisions in the Vancouver area were put on the advisory committee and were involved in guiding the project.

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IV Conclusions

1. The project staff adopted, modified, and developed modular curriculum and learning materials according to the perceived needs of the B. C. student.

2. The learning system developed by the project committee was tried out in two demonstration classes in which it proved to be workable and showed some evidence of greater efficiency in the number of days required per grade.

3. It was demonstrated that "Life Skills" could be integrated into the B.T.S.D. subjects in accordance with the objectives.

4. The Science course was re-organized into a series of projects to be worked on by small groups. This method provided relief from continuous individual work as well as practice in co-operative learning.

5. The T. A. B. E. (Test of Adult Basic Education) standardized achievement tests should be used with caution:

   (a) because it is not a proper reflection of V. A. S. T. course content and

   (b) because it is an unreliable measure of student grade level (especially from grade VIII through to XIII).

V Recommendations

1. That a second phase programme be entered into so that the material developed be further tested and refined.

2. That all instructors who use V. A. S. T. materials have in-service training before commencing to instruct a course.

3. That the present V. A. S. T. Advisory Committee form the nucleus of a Provincial Advisory Committee for B. T. S. D.

4. That C. T. B. S. standardized tests be used in Phase II rather than T. A. B. E. tests.

5. That the Department of Education in co-operation with Canada Manpower endeavor to develop valid provincial standardized B. T. S. D. tests.

6. That the V. A. S. T. student achievement [illegible] be incorporated as part of Phase II after some minor revisions.

7. That instructors for the demonstration group courses be appointed for 27 weeks.

8. That the demonstration class be assigned numbers and all test results, etc. be forwarded through Mr. Hindle.

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Saskatchewan Newstart
Vancouver City College
B. C. V. S. Burnaby
Curriculum Development Branch, Department of Education
Regional Office of Canada Manpower and Immigration, Vancouver
Headquarters of Canada Manpower and Immigration, Ottawa

ADVISORY COMMITTEE

I wish also to extend my sincere appreciation to the following people who have assisted in completing a very successful project during the past twelve months:

Mr. F. Dolman	Project Director
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Mr. D. Knox	Instructor
Mr. H. J. Rusk	Instructor
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January 23, 1974

Mr. Derek Knox
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Dear Derek:

As I mentioned in our telephone conversation I have recently had access to a means of obtaining some significance tests on data obtained in VAST Phase I. I did several tests and obtained some rather interesting results.

First I might again note the meaning of significance levels. If the difference between two groups is said to be significant at the .01 level then this difference represents the true state of affairs, on average, 99% of the time and only 1% of the time will this difference have appeared only by chance.

On page 11 of the main text of the final report of VAST Phase I the mean rates of gain in terms of days per grade were given for both groups for each subject area. Significance tests showed that for Reading, Arithmetic, and the Total Test Battery the difference between the Demonstration and Comparison Groups was significant at the .001 level. The difference for Language wasn't significant.

On the same page the figures for total possible days were given for both groups. The number of days for the Demonstration Group was on the average 22% less than for the Comparison Group. A significance test on this difference shows it to be significant at the .01 level. On page 12 the result that the VAST group achieved very similar levels of grade gain (the difference was not significant) in 22% less time was given. This figure was, however, based on all students, including the dropouts, but since we don't have any grade gain for the dropouts, it would perhaps be more realistic to look at the time spent in the course by those who didn't drop out. A comparison of the mean total possible days for the 51 VAST students and the 27 comparison group students who didn't drop out shows that the VAST group achieved the similar grade gain in 34% less time. This figure is significant at the .001 level.

..2

On page 13 of the report the dropout rates are given for both groups. I did a test of significance of the difference between these two proportions (the small sample sizes make this test quite shaky) and found that the difference was not significant at the usual .05 level but rather at the .06 level, which is really quite close.

I know these statistics are quite a bit after the fact, but they are still rather interesting and I'm only sorry I wasn't able to obtain them last summer. I look forward to receiving more material from you and will probably be talking to you again before I see you in March.

Yours sincerely,

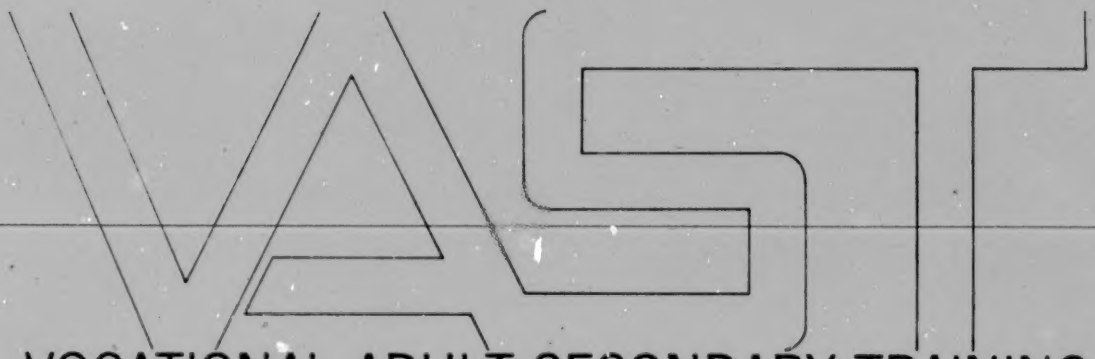
Barbara Newbegin

B.J. Newbegin
Statistician
Occupational & Training Analysis
& Development Branch

APPENDIX I

V.A.S.T. STUDENT MANUAL

Revised August 1974



VOCATIONAL ADULT SECONDARY TRAINING

V. A. S. T. STUDENT MANUAL

NOTE: IF YOU ARE GOING TO BE ABSENT TELEPHONE _____ AND TELL THEM THAT YOU WILL NOT BE IN TODAY. MAKE SURE YOU ALSO CLEARLY EXPLAIN THE REASON FOR YOUR ABSENCE.

A BASIC ADULT EDUCATION CURRICULUM DEVELOPMENT PROJECT
FOR
BRITISH COLUMBIA

This Student Manual is your property. Put your name on it and keep it handy so that you can use it at any time. It has holes punched in it so we suggest you keep it in a ring binder. If you do it will always be handy and you can add anything you want to it.

SUPPLIES

Probably one of your first concerns will be about getting started in this course. There are many ways to keep your work organized, but here is the method that has worked best for students in the past. The first step is to obtain a large three ring binder and divide the pages up into three sections. Place this manual at the front. When you use this method you can place the Item sheets (pages that help you learn) for each subject area in a seperate section followed by the work for that sheet. The following is a complete list of supplies for this course.

a. 1 three ring binder

b. 1 large package of looseleaf refill

c. 2 pens

d. 1 pencil and eraser

e. 1 ruler (6" will do)

f. 1 marking pen (you will mark much of your work)

COURSE CONTENT

Now that you know what you need for this course, you may wish to know what you will learn. As you probably know, this program is designed for adults who want to continue their education after being away from school for some time. The program includes three main subjects, Communications, Mathematics, and Science. It is an individualized BTSD program and the stated aim of BTSD is, "to upgrade individuals academically in as short a period of time as possible to enable the student to qualify for employment or for enrolment in specific vocational training programs." This means that you are here because you have a specific goal that requires more formal education.

In BTSD, level III is called a grade ten equivalency and the level IV (which can be taken by students who do well in level III) offers a grade twelve equivalency. While the level IV in not university entrance, it is suitable for entry to most trade courses in British Columbia. In the same way, most employers recognize these courses for hiring purposes. Try to keep in mind, however, that the opportunities are better for the student with a high level of achievement than for the student who achieves less. The course consists of 'core' and 'optional' units, which can be seen on the back of the sample certificate in this manual. Optional units are provided for students whose career plans require extra skills.

COMMUNICATIONS:
The Communications section is designed to improve your ability to communicate with others. In group sessions you will be expected to take part in discussions about such things as, working with other people, career planning. and classroom administration. You should use these discussions to improve your vocabulary and listening skills. The S.R.A. reading program will build your vocabulary and enable you to read with greater understanding if used regularly. The Communications core is designed to improve your communications in writing by helping you to master correct word usage, effective sentence structure, paragraphing and other skills.

MATHEMATICS:
The Mathematics core is designed to improve your skills in operations with whole numbers, fractions, decimals, percent and measurement. More advanced topics are covered as options. Check the flow chart on the back of the sample certificate for details.

SCIENCE:
The Science core is designed to inform you about the world in which we live and the scientific method. More advanced topics are handled as options.

LEARNING METHODS

You will find this course is going to be quite different from the last course you took in school. The content of Mathematics and Communication is mostly 'individualized'. This means that the program is designed for individual study in only those parts of the course that you need and no more. You will not have to do work that you already

know, and you will be able to go at the rate that is best suited to you.

There are two types of Unit in this program. The first is the diagnosed Unit described below.

1. Diagnosis: This is a group of questions which indicate what you know and what you don't know. From the results of the Diagnosis, you will be required to do Items on what you do not know.

2. Item: An Item of work consists of objectives, (descriptions of what you must be able to do) learning resources, (books, tapes, films, etc. which you use to learn) learning activities, (the work you must do to learn the objectives) and Item Progress Checks (short tests to ensure that you can meet the objectives).

3. Unit: When you have completed all Items for the Unit, you are ready to write the Unit Progress Test. Successful completion of the test indicates that you are ready to move to the next Unit.

The second type of Unit is the prescribed Unit. It does not have a Diagnosis (step number one above) and your task is simply to work through the Item sheets in the order that they are presented. Like the diagnosed Unit, the prescribed Unit has Item Progress Checks and Unit Progress Tests to be written. Both types of Unit are designed so that you can learn the required material at your own rate. Soon you will probably be working at a unique level in Communications and Mathematics. In Science, however, you may be working with a group of people and this needs a slightly different approach.

The Science groups would include from three to six people and the groups may move at different rates. If your plans include a trade that recquires a great deal of Science, such as the mechanical trades or further BTSD, you should try to work in a group that moves fast enough to allow time for some of the optional Units. If your future plans do not require a great deal of Science you may go at a slower rate, so that you can concentrate on those things that you

do need. When you enter the class you may wish to join a group or help form a new group. You will be working with others because some subjects, such as Science, are best learned in groups. Remember that the success of your Science group will be largely determined by the amount of effort you put into it. The best way to learn through group activities is to get involved and contribute as much as you can to the task or topic under consideration. Make a resolution never to be guilty of holding up your group by failure to complete work on time, waste time, or be absent. You may not even care for some of the people you work with, but you all have a job to do and your main concern is to see that it gets done as quickly and thoroughly as possible. If members of your group seem to have trouble keeping up, be sure to give them every bit of help you can. If you have trouble keeping up be sure to ask for help from the others so that you will not slow them down.

In Communications, some of your time will be spent in developing your speaking and listening abilities through classroom discussions. You may be asked to do some preparations for a group discussion and you should always strive to contribute to it. As well as contribute to the discussion, you should carefully listen, and think about, the contributions of others. If there are topics which you would wish to see discussed, suggest them to the rest of the class in a planning session. The following is a list of questions to ask yourself. See if you can answer 'yes' to all of them while you are in the course.

1. Do I share my knowledge and propose new ideas, activities, procedures, etc.?
2. Do I ask questions? Do I bring the ideas of others together? Do I summarize the ideas of others?
3. Do I know what we are trying to do? Do I keep the other members on the right track?
4. Do I encourage others to take an active part in the affairs of the group?
5. Do I help arrange chairs, clean up, etc.?
6. Do I help make peace in a dispute? Do I try to see that everyone gets along?

COMPLETION

In order to complete this course you must have completed all the core Units in the three subject areas. As you can see from the sample transcript there are many options. When you complete the course, the names of the options which you have completed will appear on your transcript. You will also receive a certificate to show you have completed the course. It has been pointed out that the optional Units of study are present in order to help career preparation. In selecting the options that you need, be sure to seek as much information on careers as you can. Such information can be obtained from manpower counsellors, trade school instructors and employers. It is your job to seek out this information and select the options in accord with it. Be quite sure that you have all the options you need for your future before you leave the course. There is a list of suggested options for the various vocational training programs on page 15 of this manual. All these courses require grade ten equivalency for entrance.

PLANNING YOUR WORK

On page 6 and page 7 of this manual you will find a copy of the Student Progress Chart. With the progress chart, which contains its own set of directions, you will be able to plot your way through the course and make sure that you are progressing evenly through the subject areas.

In addition to the Student Progress Chart this course features a Weekly Study Plan and Achievement Record, an example of which is on page 9 and page 10. With this planning sheet you may plan your work in each subject area and record work done and the results of tests. Once every week start a new planning sheet and hand in the old one. It is important to record all the things that you have done in order to be sure what to do next. Keep the sheet in a handy spot and try to do all the work that you planned to do in a week. When the sheets are handed in they become part of your permanent record in your personal file folder.

CORE

UNIT	I Whole Numbers						II Fractions						III Ratio			IV Decimals					V Percent				VI Consumer Math							VII Measurement				
ITEM	A	B	C	D	E	F	A	B	C	D	E	F	A	B	C	A	B	C	D	E	A	B	C	D	A	B	C	D	E	F	G	A	B	C	D	E
MATHEMATICS	Reading and Writing	Addition	Subtraction	Multiplication	Division	Problem Solving	Reading and Writing	Addition	Subtraction	Multiplication	Division	Problem Solving	Reading and Writing	Operations	Problem Solving	Reading and Writing	Addition & Subtraction	Multiplication & Division	Equivalents	Problem Solving	Reading and Writing	Operations	Computation	Applied Problems	Payroll & Deductions	Income Tax	Banking & Borrowing	Operating a Home	Operating a Car	Budgeting	Metric System	Time	Distance	Liquid	Weight	Problem Solving

UNIT	I Working with Words					II Spelling	III Mechanics of Writing					IV Reading					V Writing Sentences				VI Writing Paragraphs				VII Skills in Research			VIII Personal Writing			
ITEM	A	B	C	D	E		A	B	C	D	E	A	B	C	D	E	A	B	C	D	A	B	C	D	A	B	C	A	B	C	D
COMMUNICATIONS	Basic English	Plurals	Contractions & Abbreviations	Prefixes and Suffixes	Synonyms, Antonyms, Homonyms	No Individual Items	Handwriting	Capitalization	Punctuation	Possessives	Usage	Word Meaning	Basic Comprehension	Author's Purpose	Fact and Opinion	Advertising	Sentence Forms	Sentence Use	Sentence Structure	Variety	Structure	Development	Applied Writing	Proofreading	Using Books	Summary Skills	Locating and Presenting	Forms	Business Letters	Resume	Personal File

UNIT	I Foundations of Science	II Human Biology		III Health		IV Safety and First Aid		V Drugs	VI Ecology		VII Physical Science		VIII Heat, Light & Sound		
ITEM	A	A	B	A	B	A	B	A	A	B	A	B	A	B	C
SCIENCE	Methods of Science	Living Matter	Body Systems	Foods and Nutrition	Disease Prevention	Accident Prevention	First Aid	Drug Problems	The Earth and Life	Man and His Environment	Chemistry	Physics	Heat	Light	Sound

HOW TO USE THIS CHART:

1) Plan what you should do in each subject for one week.
2) Shade in the ITEMS which you plan to do thus:
3) After you successfully complete the studies and test for the item, shade in the item thus:
   so a completed item will look like this:
4) Be sure you work your way through all the core subjects at about the same rate.
5) Mark in your optional units as you select them.
6) Write the details of your planning and all your test marks on your Weekly Planning Sheet.
7) At the end of each week check your progress, and plan for the next week.

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OPTIONS

VIII Perimeter, Area, Volume	A	B	C	D	E
	Figures and Forms	Perimeter	Area	Volume	Problem Solving

IX Statistics	A	B	C	D	E
	Average	Line Graphs	Bar Graphs	Circle Graphs	Problem Solving

X Geometry	A	B	C	D	E
	Lines	Angles	Triangle	Scale	Problem Solving

XI - Integers and Rationals	A	B	C	D	E	F
	Definitions	Addition & Subtraction	Multiplication & Division	Order of Operations	Factoring	Problem Solving

XII Algebra	A	B	C	D	E
	Variables & Expressions	Sentences	Algebraic Solutions	Powers	Problem Solving

XIII MATH Devices	A	B	C
	Powers and Roots	Logarithm Tables	Slide Rule

IX Writing Composition	A	B	C	D
	Narratives	Descriptive	Expository	Argument

X Critical Reading	A	B	C	D	E
	Setting	Plot	Characters	Conflict	Themes

XI Technical Reports	A	B	C	D
	Making Notes	Charts & Diagrams	Outlining the Report	Writing the Report

IX Chemistry	A	B	C
	Properties of Matter	Elements & Compounds	Chemical Reactions

X Mechanics	A	B	C	D
	Force and Work	Simple Mechanics	Energy	Motion

XI Gases	A	B
	Properties of Gases	Oxygen and Hydrogen

XII Hydraulics	A	B
	Water	Hydraulics

XIII Heat	A	B	C
	Heat & Temperature	The Effects of Heat	Heat Transfer

XIV Electricity	A	B	C
	Magnetism	Static Electricity	Current Electricity

CAREER GOALS:

1) _____

2) _____

3) _____

ESTIMATED COMPLETION

Date: _____

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On the following page you will find a sample copy of the Weekly Study Plan and Achievement Record. It is a typical planning sheet for a student in her second week. Read the explanation of this student's planning given and examine the planning sheet to see how it helped her to do her week's work.

As you can see Sally plans to be finished the course by April 30. She has calculated that if she is to be finished on that date a certain rate of progress will be needed. In order to allow time for some options that she needs, Sally has calculated that by the end of the second week she should be finished Unit Two in Communications and Mathematics, and have most of Unit One completed in Science. In order to keep up this rate of progress, Sally marked all this work down under the WORK PLANNED section of her planning sheet. In addition to this she set herself some work in S.R.A. and, with the rest of the class, she agreed to some class meetings. Looking at the work that Sally did during the week, which she recorded, will tell you how well she was able to keep up to her plans. How well did she do? Will she have to catch up in some areas? Was her planning accurate? What do you think her next planning sheet will look like?

WEEKLY STUDY PLAN AND ACHIEVEMENT RECORD

Name Sally Sample Week of Jan. 15 → 19

Estimated completion April 30 Weeks left 15

WORK PLANNED	WORK COMPLETED	Score	Date
MATHEMATICS			
Write Diagnosis II	Wrote Diagnosis II		15/1
Complete Unit II doing work in Item A and C	Complete work in Item A		15/1
	Wrote Item Progress Check IIA	14/14	16/1
	Completed work on Item C		16/1
	Wrote Item Progress Check IIC	8/10	17/1
	Did work indicated on Learning Activities sheet		18/1
	Wrote Item Progress Check IIC form 2	10/10	19/1
	Did not finish Unit II		
Estimated Time 10 hrs	Time Spent 11 hrs		
SCIENCE			
This week our group (Pat, Faye and I) will discuss our reading and view the filmstrips. We plan to meet on Tues. and Thurs. mornings. We will hand in our written assignments on Friday and write Unit Progress Test I next week	Discussed Sciences, A Way of Knowing, - 1½ hr		16/1
	Viewed Filmstrip - ½ hr		18/2
	Wrote paragraph on Louis Pasteur - 3 hrs		18/2
	Review for test (alone) - 3 hr		19/2
Estimated Time 8 hrs.	Time Spent 8 hrs.		

WORK PLANNED	WORK COMPLETED	Score	Date
COMMUNICATIONS			
Finish Unit II	Diagnosis II (no work needed)		15/1
	Diagnosis III		16/1
need work in Item B and C (Unit III)	Did work as indicated on Learning Activities Sheet for Item B		17/1
			18/1
			19/1
Estimated Time. 8 hrs.	Time Spent. 6 hrs.		
S.R.A. POWER BUILDERS			
Colour: Violet	Colour: Violet		1/day
To do: 4,5,6,7,8	Done: 4,5,6,7,8		15→19
S.R.A. RATE BUILDERS			
Colour: Violet	Colour: Violet		1/day
To do: 4,5,6,7,8	Done: 4,5,6,7,8		15→19
Estimated Time.....	Time Spent. 3 hrs.		
ORAL COMMUNICATIONS			
Weekly Planning Monday 1 hr.	Planning completed in 3/4 hr		15/1
Class meeting Wednesday afternoon	NASA Game in Working together		17/1
Estimated Time. 2-4 hrs	Time Spent. 2 hrs		

WEEKLY STUDY PLAN AND ACHIEVEMENT RECORD

Name..... Week of.....

Estimated completion..... Weeks left.....

WORK PLANNED	WORK COMPLETED	Score	Date
MATHEMATICS			
Estimated Time.....	Time Spent.....		
SCIENCE			
Estimated Time.....	Time Spent.....		

WORK PLANNED	WORK COMPLETED	Score	Date
COMMUNICATIONS			
Estimated Time.....	Time Spent.....		

S.R.A. POWER BUILDERS		
Colour:	Colour:	
To do:	Done:	
S.R.A. RATE BUILDERS		
Colour:	Colour:	
To do:	Done:	
Estimated Time.....	Time Spent.....	

ORAL COMMUNICATIONS		
Estimated Time.....	Time Spent.....	

THE GOVERNMENT OF
THE PROVINCE OF BRITISH COLUMBIA

DEPARTMENT OF EDUCATION
POST - SECONDARY DIVISION

This is to certify that

_____

Has completed the "BASIC TRAINING FOR SKILL DEVELOPMENT"
Program, Level _____. Giving a Grade _____ Equivalency

_____ _____
School *Instructor*

_____ _____
Date *Principal*

SAMPLE

TRANSCRIPT

BASIC TRAINING FOR SKILL DEVELOPMENT

Communications

Working with Words	Spelling	Mechanics of Writing	Reading	Writing Sentences	Writing Paragraphs	Resource Skills	Personal Writing
I	II	III	IV	V	VI	VII	VIII

Writing Composition	Technical Reports
IX	XI

Critical Reading
X

Mathematics

Whole Numbers	Fractions	Ratio and Proportion	Decimals	Percent	Consumer Math	Measurement
I	II	III	IV	V	VI	VII

Perimeter Area Volume	Geometry	Algebra
VIII	X	XII

Statistics	Integers & Rationals	Math Devices
IX	XI	XIII

Science

Foundation of Science	Human Biology	Health	Safety and First Aid	Drugs and Society	Ecology	Physical Sciences	Heat Light Sound
I	II	III	IV	V	VI	VII	VIII

Chemistry	Gases	Heat
IX	XI	XIII

Mechanics	Water and Hydraulics	Electricity
X	XII	XIV

CORE — **OPTIONS**

The "core" block is designed to bring the student to Grade Ten equivalency. The optional units are provided so that the student can tailor extra learning to his individual career plans. The student holding this Transcript will have completed all of the units designated "core" and those "options" listed below, with minimum criteria of 85%.

COMMUNICATIONS	MATHEMATICS	SCIENCE

SAMPLE

COURSE SELECTION GUIDE

VOCATIONAL COURSES	VAST OPTIONS	COMMUNICATIONS			MATHEMATICS					SCIENCE								
		Writing Compositions	Critical Reading	Technical Reports	Perimeter, Area, Volume	Statistics	Geometry	Integers and Rationals	Algebra	Math Devices	Chemistry	Mechanics	Gases	Water and Hydraulics	Heat	Electricity		
AGRICULTURE					✓													
APPLIANCE SERVICING															✓	✓		
AUTO BODY REPAIR					✓							✓				✓		
AUTO MECHANICAL REPAIR					✓		✓					✓				✓		
BAKING						✓									✓			
BTSD LEVEL IV		✓	✓	✓	✓	✓	✓	✓	✓									
BEEF PRODUCTION					✓	✓						●						
BENCHWORK – JOINERY					✓		✓					✓						
BOILERMAKER					✓		✓					✓		✓	✓			
BRICKLAYING					✓		✓											
CARPENTRY					✓		✓				✓	✓				✓		
COMMERCIAL GENERAL		✓		✓														
COOKING					✓										✓	✓		
DIESEL ENGINE MECHANIC					✓	✓	✓					✓	✓		✓			
EARLY CHILDHOOD EDUCATION		✓			✓	✓												
ELECTRONICS & ELECTRO MECHANICS					✓	✓	✓	✓	✓			✓				✓		
GLAZIER							✓											
HAIRDRESSING																		
HEAVY DUTY MECHANIC					✓							✓		✓	✓	✓		
HEAVY EQUIPMENT OPERATOR					✓							✓						
INDUSTRIAL RECORDS & FIRST AID																		
IRONWORKER					✓		✓					✓			✓			
LATHING					✓													
MARINE ENGINE REPAIR					✓		✓					✓	✓		✓			
MEAT PROCESSING						✓									✓			
MILLWRIGHT					✓		✓					✓	✓	✓				
NURSING ORDERLY					✓	✓												
OFFICE MACHINE MECHANIC						✓		✓	✓	✓		✓			✓	✓		
PAINTING AND DECORATING					✓		✓											
PLUMBING AND STEAMFITTING					✓	✓	✓	✓	✓	✓		✓			✓	✓		
PRACTICAL HORTICULTURE					✓										✓			
PRACTICAL NURSING					✓	✓												
PRE SCHOOL TEACHER TRAINING		✓			✓	✓	✓											
SHEET METAL					✓		✓					✓			✓			
SIGN PAINTING					✓	✓	✓					✓				✓		
SMALL ENGINE REPAIR					✓							✓	✓					
WATER & WASTE WATER TREATMENT					✓		✓							✓				
WELDING					✓		✓					✓			✓	✓		

ANY 2 SCIENCE OPTIONS

APPENDIX II

V.A.S.T. INSTRUCTOR MANUAL

Revised August 1974

FOREWORD

The purpose of this Instructor's Manual is to outline the basic philosophy and procedures of the VAST Program, a BTSD Level II-III demonstration project created as a Special Project of the B.C. Department of Education. The outline stating the purpose of the Demonstration Project requested that a program be draughted which had, "... a curriculum expressed in modular units and in terms of clear behavioral objectives." It was desired that, "... each student be pre-tested and counselled to choose the modular units he requires to learn, and proceed at the rate best suited to his abilities." In addition to this it was expressed that the course should pay some attention in the area of "life skills". The outline also suggested that, "Consideration will be given to which units can best be mastered by individualized instruction and which would best be acquired through group work."

The program was drawn up during the months of September through December 1972. This was followed by a test project of two classes that started on January 8, 1973 and ended the following June. On the basis of the class results and observations, the program was further refined with the first phase of the VAST Project ending on August 31, 1973.

V.A.S.T. Project

Research & Development Staff (Phase I)

Mr. F. Dolman, Director
Mr. D. Knox
Ms. M. Peemoeller
Mr. H. Rusk
Ms. D. Wilson

During the second phase (September 1973 to August 1974) of the VAST Project, the materials were used by 12 classes in different parts of the province of B.C. (Vancouver, Burnaby, Abbotsford, Chilliwack, Lytton, Creston, Fish Lake, Bella Coola and Duncan). When the classes were completed, a group of the instructors met and further revised the course to its present state. We hope revision will be an ongoing process. What follows in this manual is a description of the program as it presently exists.

Project Supervisor (Phase 2)
Mr. Derek Knox

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PHILOSOPHY:

The underlying philosophy of the VAST Programme has been dictated by the needs of its clientele. This has led to the development of a learning programme which can truly be described as student centred, one which is designed to be of the maximum benefit to the student, sometimes at the cost of introducing administrative and instructional difficulties. In order to best assess the needs of the client group, the VAST staff engaged in considerable research. The research findings and their implications on design philosophy are discussed below.

One of the most obvious characteristics of the B.T.S.D. client group would seem to be their lack of homogeneity. The course attracts people of extremely diverse ages, abilities, backgrounds and ambitions. This has clear implications for curriculum design. The ideal approach would be to tailor a course to the specific needs of each individual student, and, where possible, this is what the VAST programme seeks to do. A significant part of the course contents is optional and need not be taken for certification. The optional units are designed to aid the student in the pursuit of his or her chosen career. An example of this is the science unit on Gases, which was designed for an individual who chooses to follow up his B.T.S.D. with a course in welding. The selection of optional units is done by the student on the basis of his future plans and in consultation with his counsellor and instructor. Such a flexible approach to curriculum design meant that the VAST programme, would have to adopt individualized learning procedures which would allow each student to move at the rate best suited to his past experience or background.

Since the need or desire to obtain new skills rarely occurs within individuals at any set date, it was felt that the requirements of the student would best be met if he were able to enter the programme when he felt it desirable to do so. In addition to this a programme with a flexible intake is more responsive to employment fluxion caused by seasonal work patterns. These factors dictated the development of a programme which could accept new intake on a daily basis, a challenge that has been met by the VAST programme.

Content in the subject areas of the programme was determined largely by the demands of occupations and vocational courses , that the client group was aspiring towards. Since this is a commonly acknowledged approach to content selection in B.T.S.D. course design, the content does not vary greatly from other similar programmes. In fact VAST content is almost completely in accord with the DACUM charts for B.T.S.D. courses compiled by the Department of Technical and Vocational Education, Curriculum Development Branch. The main exceptions to this is in the 'life skills' area. One reason for such a change was the observation that the majority of students taking B.T.S.D. do not seek further vocational training. It must be assumed then, that most people who take B.T.S.D. return to the work force with their new skills and renewed enthusiasms. With this in mind the VAST programme includes career planning and 'Creative Job Search.'

A second reason for the inclusion of 'life skills' learning is the observation that the client group often harbour negative 'social' attitudes. Research indicates that the client group have, "...a lack of self-confidence, low self-esteem and a high degree of dependency." Other studies have pointed to the client group's poor attitudes to work, difficulty in adjusting to change, low level of social co-operation, and weak motivation. In order to best meet the challenges of this type of 'social' learning, the VAST programme had to seek new techniques since, "...even an individual's seemingly personal opinions and attitudes may be by-products of interpersonal relations. The evidence strongly suggests that opinions and attitudes often are maintained, sometimes generated, sometimes merely enforced, in conjunction with others (other individuals)." If so, "..... then a change in these ideas (opinions and attitudes) obviously cannot be a purely individual matter..." With these factors in mind the VAST programme includes a significant portion of group learning, one objective of which is to build more positive attitudes. An example of this is in Science, where students must form a cohesive and co-operative group in order to progress through the course. In this group they discuss and learn their science objectives, and in the process, are compelled to learn to work together.

Research also clearly indicates that the adult learner is much more interested and motivated if he plays a positive role in the planning of his own course of study. The VAST student not only starts the course when he wants, selects the options he needs, goes at his own rate, and terminates when he chooses, but also lays out each week's work in advance, and keeps a record of his daily progress, on a planning sheet. In addition to this, the student also participates in any discussions of classroom management. With the planning sessions and the laying out of their own programs, the students are actively involved in mapping out their future. This, in itself, is valuable training and a positive motivation for the student.

TECHNIQUES AND PROCEDURES FOR LEARNING:

In Mathematics and Communications most work is done independently by each individual student, although at times they may find it convenient to work together for the mastery of some objectives. The students work through the programme in the sequence indicated on the VAST flow chart. Each course consists of a number of Units of study and these Units are either "diagnosed" or "prescribed". Mathematics and Communications use both types of Unit, but Science, which may be studied in groups, uses only the latter.

The first type of unit, the diagnosed unit, is used with material that the student might already know. An example of this is the area of whole number operations in Mathematics. It begins with a Diagnostic Test which determines the students knowledge of and skill in a selected group of behavioral objectives. After the student has completed the test without any outside help, it is marked by the instructor. On the basis of the results the instructor can place the student in the Learning Activities, which are sheets outlining objectives, commercial learning resources(tests, tapes, etc.) and procedures for their use at the correct level. The student uses the Learning Activities sheets to guide his learning in that Unit. Each Learning Activities sheet represents one Item for the Unit and each Unit contains from one to six such Items. When the student feels he has mastered the objectives of the first Learning Activities sheet he has been assigned, he can, with the

instructor's consultation, write the Item Progress Check for that Item. The instructor marks the check and if the student succeeds he is then able to move on. If not, he is directed back to his Learning Activities sheet and more work. At this point the instructor might make specific additional suggestions for study, assign a peer for assistance, or engage in tutoring the student himself. There is a second form for the Item Progress Check which the student can attempt next. When all the items of a unit are completed there is a Unit Progress Test, to be completed before the entry to another Unit.

The second type of learning unit in the VAST programme is the prescribed unit. This type of unit does not feature a diagnosis because it deals with work that student would not normally be familiar with, for example, Chemistry or critical reading. In the case of the prescribed unit, the student begins with Learning Activities rather than a diagnostic test. When the student has finished all the work outlined on the sheet he takes an Item Progress Check and if successful, continues to the next Item. This process is repeated until the Unit is finished. At that time the student writes the Unit Progress Test. Science varies slightly from this in that all of the Learning Activies Sheets are bound together and there are no Item Progress Checks. In Science the students may work in small groups (3-5) and write each test at the same time. These groups are formed on the basis of criteria such as: occupational plans, completion dates and compatibility. Group members are encouraged to feel responsible for each other, and to assist one another in achieving the objectives.

All students start the Mathematics course at the same point by doing the first diagnosis of the compulsory, or core, section. This helps place the student in his individualized program, which he works through until the core is completed. At this point he can take any optional units that he may require. The Communications course operates in much the same fashion. Both sections of the program are completely individualized and self-instructional, although students may work together to help master objectives and can easily get special assistance from the instructor or a fellow student.

Science and Oral Communications differ from the other components of the program in that they are designed for students working in groups. In Science the student should work at the rate of his group, but the varying rates of students, their differing teminal goals and entry dates, sometimes makes this difficult. In this case the composition of the group can be altered or students may work on their own. Like Mathematics and Communications, however, Science is self-instructional and the students are able to master the objectives with a minimum of instructor aid. Oral Communication is done with the whole class as a group and includes the instructor. Usually a stimulus is presented by the instructor which is used to facilitate group discussion and problem solving. Often the stimulus will be an actual problem in classroom management which must be solved by the group. Well organized class meetings of this sort also function as a vehicle for the development of communications skills.

One of the unique features of the VAST program is the use of a Planning Sheet and a planning period, a feature that involves the student in the creation of his own individual program. Time may be set aside each week for the students to plan exactly what they will do in the following week. They estimate their completion date and budget their time to work toward that goal. As well as planning how many items or units of work will be accomplished, the student may arrange for meetings with his Science group in order to schedule discussions, labs, and tests. The class must also decide when any whole group activities can be scheduled. All of this planning is recorded on the student's Planning Sheet, which he keeps through the week. As he finishes each scheduled piece of work he records this on the Planning Sheet. When the next planning session arrives, the student examines the work done on the old sheet and plans his next week's work. The old Planning Sheet, complete with all the records of his last week of work, is handed in and placed in the student's personal file. The Planning Sheet not only organizes the student but also gives him positive motivation by breaking the course down into weekly bits. It further helps the student to assess his own capability in terms of what has to be done, lay out a realistic plan, and carry this plan out to successful completion. This is a valuable skill in light of the "live for today" attitude of many students upon entry.

Another unique feature of the VAST program is the procedure for continuous entry. If the instructor does not have enough time to introduce new students to all components of the program, this work may be largely done by a sponsoring student and a Student Manual. When a new entry comes to class the instructor introduces himself to the student and may assign a current class member to orient the new entry to the program. This sponsoring student has specific duties to perform, such as introducing the new student to his classmates and generally initiating him into the class. The sponsor is guided by a copy of the New Intake Checklist, which explains all the functions a sponsor is expected to perform, and the new student is given added guidance from a Student Manual, which explains the content and process of the VAST course. A copy of the New Intake Checklist is located on page 7 of the Instructor's Manual. In addition to this, the Student Manual contains a copy of a VAST Progress Chart, which maps out the work to be done by the student. With these special aids the new student becomes oriented to the course with a minimum of instructor time; in fact the instructor's main task will be to check and see that the student is getting off to a good start.

Name_____

Name of New Student_____

If you have volunteered to introduce a student to this BTSD class, you have taken on an important assignment. From your own experience of entering a course after having been out of school, you will be able to see the importance of a thorough introduction. Don't forget to remind the other members of the class that they also have a responsibility in this area.

Keep this sheet as a guideline and record and hand it in with your next weekly planning sheet. Check these items off as you, ot others, do them. Make sure that you do not try to do too many at once. Remember that it is important that the new student is comfortable and understands what he is to do and why he is to do it.

-I have helped him fill out any required registration forms.

-I have helped him go through any required registration procedure.

-I obtained a copy of the Student Manual for the new student and went over it with him or her.

-I have shown the new student the premisis, including the location of the subject centres.

-I have introduced him or her to some of the other students.

-I did my best to see that any transportation problems the student might have had are resolved.

-I explained the way in which books can be borrowed.

-I have explained the basic nature of the individualized process and I started him off on the first Mathematics Diagnosis.

-I checked with him or her at least twice daily for the first week.

-I did the best I could to see that he got off to a very good start in this course.

INSTRUCTOR'S ROLE:

The instructor must be prepared to fill the many conventional, and a few unconventional, roles in the classroom. The instructor must be familiar with course content and he must be able to help with specific student learning problems. He or she must be able to accept the B.T.S.D. clientele as individuals worthy of respect, must be able to help them gain a positive self-concept and encourage them to even greater accomplishments, must be willing to listen to their point of view, to accept some of their suggestions, and should be on a first-name basis with them in, and out, of class. The instructor is now more of a manager of learning than in a more conventional classroom. Since each student plans his own individual programme week by week, the instructor must make sure that each student is working as efficiently as possible. Part of this task will involve the close inspection of weekly Planning Sheets to see that the students are keeping up to the required work commitments and are not spending too much time in one area. It is a good idea to have each student check with the instructor before he writes a test. With this technique the instructor can ascertain whether or not the student is ready to write the test and can see the student's progress in each subject. He will probably find marking to be time consuming and should plan to allow about an hour every day, out of class, for its completion; however little time is needed for lesson planning in class. Most of his time in class will probably be spent in circulating, making sure that students are on the right track and helping where needed. In some situations the students may be allowed to correct their own tests, but the instructor must keep a close contact with the progress of each student and marking helps him to do this.

Some knowledge of group dynamics and the way people work together would be a great asset to the instructor since part of his job will be to make sure that the groups function smoothly. The groups are encouraged to organize themselves as much as they can but the instructor must keep a sharp eye out for group breakdown. At such times he must see to it that the group continues to function, even if it means being an arbitrator in group disputes.

The VAST instructor should have a considerable knowledge of the world of work, since part of the programme involves career exploration and planning. The key to such a counselling role is, and must be, indirectness. Although the student must make his own plans for the future; they must be made on the basis of the best information he can obtain. Part of the student's assignment is to search out career information from every conceivable source. An instructor with a broad knowledge of employment could be of great assistance to the student.

IMPLEMENTATION:

The VAST programme is extremely versatile and could be run in a large college or in a church basement. The basic requirements for twenty or less students would be a well-lit area the size of a regular school classroom, although the shape of the room is of little or no consequence. If possible the room should be equipped with tables and chairs that can be moved easily. Trapezoidal tables should be considered the ideal due to their flexibility of arrangement. All of the programme materials can be placed on tables for the convenient use of the students although a small store-room would be ideal if it were adjacent to the classroom. In any event the materials can all be put away and brought out in less than five minutes so the room could be shared with other groups who might use it at other times.

The VAST programme itself is not an expensive proposition in that it requires about $2500.00 in commercial learning materials, in addition to the VAST programme materials and the required hardware, which consists of a sound filmstrip projector (Dukane Cassette Micromatic or equivalent), an extra cassette recorder, six headphones and a listening post. A 16 mm. film projector should also be available for occasional use.

While it is not imperative that the instructor receive special training it would be desirable. Instructors who have not used an individualized programme such as this, and who have not had experience or training in working with groups, would be at a serious disadvantage in implementing the course. In addition any instructors who have no experience working with disadvantaged adults should be introduced to some of the principles and techniques of adult education.

ADMINISTRATION

(a) Presentation of Materials: The materials and resources are best kept in a large closet or storeroom located next to the classroom, if this is possible. If not, materials can be kept in the classroom. With either method, it is wise to set up subject centres. The commercial learning materials can then be organized around the boxes of program materials. Students should return materials to the proper subject centre and keep the area tidy.

The Item Checks, and Unit Tests should be kept under reasonable security and all completed tests and diagnoses should be returned to the instructor and kept out of general circulation.

(b) Register and Records: It is a good idea to obtain a B. C. Public school "Register of Pupils" in order to keep a complete record of atten ance. If this is kept carefully, any other forms that are required by Canada Manpower local school or college authorities, can be easily completed. While on the topic of attendance, it should be remembered that the students are being paid to be in class in much the same fashion that they might be paid for being an employee, therefore attendance should be good. There is usually a waiting list of students for BTSD programs, and an individualized program with continuous intake can quickly accept a new student to fill the seat of any student unwilling to make maximum use of his present opportunity.

In addition, it is wise to keep an anecdotal record of the progress of the students in the program. This is very useful for those who may engage in future curriculum development of the program. Comments such as the students initial reaction to the program, program weaknesses, omitted vital content, etc. are best made note of. The anecdotal record can also be used to monitor student progress. This can be done by a periodic interview and discussion with the student, and an examination of his past planning sheets. Notes on the student's attitude, abilities, and initiative often can be of great elp to the instructor who is faced with writing subjective comments or draughting letters of recommendation.

Another record that may be of value is a "Borrowers List". Since there are no individual textbooks, students do not have their own copies of books to take out of class. Many will desire to do homework, which will necessitate taking books out. One method of retaining control over the learning materials is to have students sign them out, and in when returned.

(c) Student Records: Make and keep a separate file folder for each new entry to the program. In this file folder you will be able to keep any necessary forms for M npower, the Department of Education, and so on. In addition, the first page of Communications Diagnosis I, the weeksly planning sheets, a and any other student records can be kept in this folder.

STUDENT PLANNING

The Student Progress Chart in the Student Manual should be self-explanatory and it will be kept by the student for the duration of the course. It has been developed to improve motivation and work planning skills.

The Weekly Study Plan and Achievement Record, often referred to as the planning sheet, may be used as a permanent record of student progress. Once each week (Monday, perhaps), the students take some time to plan the assignments that they feel they should complete. This session will require some discussion since the students will have to schedule group meetings for the coming week. During the week the student keeps an accurate record of what he has done, and he even may set some additional goals for himself. The next planning session is used to review progress to date, and set new goals. When the new planning sheet has been started, the old one is handed in and placed in the student's permanent file folder.

CONTINUOUS INTAKE

When a new student enters the program, you may select a host student of about the same age to help the new entry. Tell the host to look in the Student Manual for directions and guidance in orienting new entrants. The instructor will have to mark student tests and diagnoses, and place the new entry into the various subjects, but the hosting student will save enough of the instructor's time to make continuous entry on a daily basis practical. A copy of the New Intake Checklist is located on page 7 of the Instructor's Manual.

Successful orientation of new intake will be largely dependent upon the degree of involvement that the class feels to this task. To facilitate this involvement, it is important to have the students discuss ways and means of welcoming a new entry before new intake arrives. Point out to the class that the new entry is in much the same position as a person beginning a new job and that he will want to learn what he is expected to do. The important thing to remember as the instructor, is that the problem must be placed square in the lap of the students. Try to encourage the class to generate as many ideas as they can to help make the stranger feel comfortable in the class. Outline the function of the hosting student in program orientation, and ask their response to it. Try to obtain a commitment from the students to carry out some of the ideas that have been suggested in the class, and point out that they all have the job of doing their best in this matter. Mention that at a later discussion it would be a good idea to question the new entrant to see how successful their efforts at orientation were. Many students in remote areas will be related to each other.

The First Week:

The following procedures are intended to be a help in starting an individualized BTSD program. While these are only suggested procedures, it should be noted that they have been subjected to close scrutiny, and if followed, will probably result in a successful program.

Day One:

The first job of the instructor is to introduce himself and welcome the students. Following this, entrance forms can be distributed and filled out. Next, the students should be given some orientation to the premises and the public transportation available. At this point it might be wise to discuss with them modes of transport, in an attempt to alleviate transportation problems by forming car pools, etc.

It is a good idea to make it clear to the students that this program will be different from any schooling they have had in the past. While this is not the place to belabour the specifics of the individualized process, it should be understood that the course will not be taught, but it must be learned. Try to avoid being overly negative, but point out that BTSD should be looked upon as a job, and if the student does not do the work expected, he will be asked to leave.

Students receive a copy of the Student Manual early on the first day. After the students have had a chance to read it, the instructor should explain its function and review its highlights. It is not expected that the subtleties of the processes will be mastered by the students upon first reading, but point put that it will answer many future questions and will be referred to often. Stress the fact that the manual is an integral part of the student's school career, since it not only contains learning procedures and outlines content, but it also explains student planning, which forms the basis of a successful individualized program. The students should be informed of Manpower regulations on attendance and sick reporting. The number to telephone for sick reporting should be copied into the Student Manual.

The students should be given some actual school work on the first day. Start with the first Diagnosis in Mathematics in the afternoon. Care should be taken to explain that the Diagnosis is a tool to discover how much they already know in order to set up the student's individual programs. Mark the tests as they come in. When the first Diagnosis is marked, take a planning sheet and fill it out with the appropriate comments. Take the planning sheet to the student and show him where the Item Sheets and commercial materials can be found. The student should not be left until he has a clear idea of what to do and how to record it. This process is repeated for the rest of the class.

Day Two:

The morning of the second day is a good time to administer the S.R.A. Starting Level Guide. The Student Record books are distrubuted to the students and when the Starting Level Guide is completed, it is handed in for marking. The students then read page 5 and 6 of the Student Record book and do the Power Builder Starter, while the instructor marks the guides. When the guides are marked the students are told what reading level colour to start working in and they can do one power builder from the kit. For additional information on procedures, refer to page 17 to 25 of the S.R.A. Teacher's Handbook.

When the students have completed their work with the S.R.A. reading materials, they can be referred to the Mathematics section of their planning sheets. Try to make sure that they all know what they should be doing in Mathematics. If there are any problems, take some time to clear them up. Avoid spending any time "teaching", subject content and concentrate on making sure that the students know how to use the Item Sheets, which list objectives, resources and activities for learning materials. Try to get the students working as quickly as possible and suggest to them that if they have problems with what they are learning, they can seek help from their classmates.

The Communications program should be initiated in the afternoon of the second day. This is done by the administration of the first Diagnosis in Communications. When the students hand the Diagnosis in, remove the first page and place it in a file folder with the student's name on it. This folder will be used to keep all of the student's future records, including the weekly planning sheets. The Communications Diagnoses should be marked with care, after the class has left for the day. In addition to placing the student in the Communications program, the results of the Diagnosis, and the S.R.A. Starting Level Guide, should indicate the presence of any students whose literacy might be too low for the program. If such students are present it would be wise to seek the assistance of a reading specialist from a local school district. If a student is illiterate or bordering on illiteracy, this course will be of little use to him.

The remainder of the afternoon should be spent in helping the students to familiarize themselves with each other. This can be promoted by an exercise such as "Ten Persons I Am". In it the students and the instructor arrange themselves in a circle and each take 10 slips of paper to write down 10 things they are, such as father, driver, sister, smoker, non-drinker, truck driver, tc. Next the students are asked to rank the slips of paper, starting with those things they could easily not be, ranging to those things that are very important to them. The instructor should start by going through his list and explaining why he has listed them in the order that he has, making an effort to help the students to 'see' what sort of interests and values he holds.

If the instructor is able to expose some of his more negative sides (smoker, procrastinator) it might help the student see that the purpose of the exercise is not merely to parrot a list of real or imagined virtues. After the instructor has finished the other people in the circle are asked

to do likewise. The instructor should make and encourage supportive statements during the exercise, such as: "I can see why you would say that." or "You sound as if you feel the same as John on that."

Day Three:

The first thing to do on the third day is to give back the marked Communications Diagnoses. They should be given back one at a time and the instructor should see that records of "work planned" and "work completed" are made by the student on the planning sheet. When this is done the student should be shown where Item Sheets and learning materials for Communications are located. When all of the Diagnoses have been distributed, each student should have a clear idea of what he needs to learn and how to go about it. The instructor's job is to curculate in the class and make sure that each s student knows what he is trying to accomplish and uses the learning activities and resources wisely. Again, the instructor should do as little "teaching" as possible. The students are going to have to learn "how to learn" and, while this can be a slow and frustrating task, it must be done if the student is to complete the program successfully. Encourage the students to vary their day by changing subjects or activities several times during the day. For all but 1½ hours in the afternoon, the students should be left to direct their own learning.

The remainder of the day should be devoted to developing an awareness of the value of working together in groups. One way to do this is with a group exercise such as the following. "Lost on the Moon" was developed by the North American Space Agency to demonstrate the value of group problem solving. If your class is typical, the group will probably arrive at a better score than any one individual.

In order to carry out the exercise, each person should be given a copy of the work sheet on the next page. If duplicating facilities are not available the sheet could be copied onto the board and students could use a scrap piece of paper. Individual rankings should be done without consultation. Next, the class should be di ided into two groups and given the task of coming to a group consensus (which might take up to an hour). Then, give them the answer key. Scores are calculated by adding up the differences between the individual ratings and the key. In almost every case,the group ranking will be closer to the key than any of the individual rankings. They key was prepared by NASA experts.

After this exercise, hold a short discussion about working together. if, for example, a student beats consensus, ask why the group was not better able to make use of his suggestions. Was he listened to? Did he offer his views? Did anyone seek his views? Why was the group consensus better than the individual rankings? It should be pointed out that the Science program is designed to be done by groups and that it is expected that they should profit from what they have just learned about working together.

The answer key can be found on page 17.

LOST ON THE MOON

Your spaceship has just crash-landed on the lighted side of the moon. You were scheduled to rendezvous with a mother ship 200 miles away on the lighted surface of the moon, but the rough landing has ruined your ship and destroyed all the equipment on board, except for the 15 items listed below.

Your crew's survival depends on reaching the mother ship, so you must choose the most critical items available for the 200 mile trip. Your task is to rank the 15 items in terms of their importance for survival. Place number one by the most important item, number two by the second most important, and so on through number 15, the least important.

ITEM	YOUR RANK	GROUP RANK	NASA RANK
Box of matches	____ ____	____ ____	____
Food concentrate	____ ____	____ ____	____
Fifty feet of nylon rope	____ ____	____ ____	____
Parachute silk	____ ____	____ ____	____
Solar-powered portable heating unit	____ ____	____ ____	____
Two .45-caliber pistols	____ ____	____ ____	____
One case of dehydrated milk	____ ____	____ ____	____
Two 100-pound tanks of oxygen	____ ____	____ ____	____
Stellar map (of the moon's constellation)	____ ____	____ ____	____
Self-inflating life raft	____ ____	____ ____	____
Magnetic compass	____ ____	____ ____	____
Five gallons of water	____ ____	____ ____	____
Signal flares	____ ____	____ ____	____
First-aid kit containing injection needles	____ ____	____ ____	____
Solar-powered FM receiver-transmitter	____ ____	____ ____	____

NASA-ANSWER KEY:

Box of matches	15-	No oxygen on moon to sustain flame; virtually useless
Food Concentrate	4-	Efficient means of supplying energy requirements
50 feet of nylon rope	6-	Useful in scaling cliffs, tying injured together
Parachute silk	8-	Protection from sun's rays
Solar-powered portable heating unit	13-	Not needed unless on the dark side of the moon
Two .45 cal. pistols	11-	Possible means of self-propulsion
One case of dehydrated Pet milk	12-	Bulkier duplicate of food concentrate
Two 100-pound tanks of oxygen	1-	Most pressing survival need
Stellar map (of the moon's constellation)	3-	Primary means of navigation
Self-inflating life raft	9-	CO_2 bottle may be used for propulsion, raft could make a sled for carrying injured, supplies, etc.
Magnetic compass	14-	Magnetic field on the moon is not polarized,
Five gallons of H_2O	2-	Replacement for tremendous liquid loss on lighted side
Signal flares	10-	Distress signal when mother ship is sighted
First-aid kit with injection needles	7-	Needles for vitamins, medicines, etc., will fit special aperture in NASA space suits
Solar powered F.M. receiver-transmitter	5-	For communication with mother ship; but F.M. requires line-of-sight transmission and short range

Day Four:

The students should now be ready to start the Science program and for this they should try to form groups. Remind the students how a Scientific problem was handled on the previous day and how the group arrived at a better decision than most or all of the individuals. Take some time to go over the references to group work in the Student Manual and try to impress the students with the need for co-operation in Science.

Ask the students to try to form Science groups on the basis of common career goals. Point out that the groups which desire to take options in Science will move much faster and spend more time on this subject. Tell them that if their future plans do not require a great deal of Science, they may try to get in a group which moves at a slower rate in order to concentrate on the things that they do need.

When the Science groups are formed, tell the students to make a note of their group on the planning sheet as well as the time when they will meet. Since only one group can work on the same Science Unit at any one time, they will have to schedule their times in consultation with each other. This will normally be done during the planning sessions and must be noted on the planning sheets. Try to see that one group finishes off this morning in Science and another group uses the Unit 1 materials in the afternoon.

Day Five:

In the morning the students can be introduced to the S.R.A. rate builders and the rate builder progress chart. Have each student do a rate builder and chart it. See pages 28 to 30 of the S.R.A. Teacher's Handbook for detailed starting procedures. Explain to the students that they should try to work through the IIIa program until they complete the green power builders and rate builders. In most cases this will mean a rate builder and a power builder per day. Explain to the students that they can get more practice from the Dimensions in Reading program. The students can be placed in this program by referring to page 9 of the Teacher's Handbook for Dimensions in Reading. This program is done without the aid of a student record book and students can read as many selections as they need per day.

At this point the students are placed in the entire program and the instructor must concern himself with making sure that all the students are using the program as it was designed to be used. The best way to do this is through close scrutiny of the planning sheets.

Finish off day 5 with a class meeting. If new intake are scheduled to arrive on the following Monday, ask the students what can be done to help work the new intake into the class. If there is no reaction to this, ask several individuals what they would like if they were coming into the class. Try to obtain a commitment from the students to help the new entrants in any way they can. When they have done this explain the process of orientation for new intake, and try to get some students to volunteer as sponsors.

Before the students leave for the weekend, try to get them to share their reactions to the first week with each other. Make sure that you take careful note of what is said and thank the students for their impressions.

MATHEMATICS:

Units I to V are diagnosed. Unit VI, however, is prescribed. See page 3 to 4 for a description of the terms 'diagnosed' and 'prescribed'. Unit VI also does not have the Unit Test, and the student will do Item Checks only. The next units, from VII to XII are diagnosed. Of these only VII is core. The options, units VIII to XI, may be taken in any order, but Unit XII should not be taken until XI is completed. The last Unit, XIII, is prescribed. It is recommended that the options be taken in numerical order, but, as explained above, this is not essential. The decision as to which options to do is determined in accordance with the student's future goals.

The criterion on the Item Checks and the Unit Tests is usually 100% for Form 1 and slightly less on Form 2. The student should be aiming for 100% proficiency on Form 1. The instructor's judgement comes in when a student misses the criterion by one mark. In this case the error must be considered by its importance. If the student understands the concept, the instructor could give him an additional question to test his understanding. If he is able to do this question he could go on to the next step in his math program. When a student has obvious difficulty as indicated by the Form 1 Item Check, he must be re-assigned to his Learning Activities. He then does more work in that Item and writes Form 2 of the Check. If he fails the second Check, the instructor must carefully go over the difficulties with the student.

The book Mathematics, A Basic Course has a separate answer key. All the other books have answer keys in their back sections. Refresher Mathematics has answers to only the odd-numbered questions. The other answers are on a seperate answer key. Make sure all the students do all the work outlined in the Learning Activities prior to writing any tests.

In both Mathematics and Communications, the student is required to hand in his work from the Learning Activities with form 2 of the Item Check if he is required to do it. This is particularly important if the student does not make the criterion. The work done should then show the instructor the areas that are imperfectly understood.

COMMUNICATIONS:

Communications is diagnosed in the first four units. For units I and III, Item A is not Item checked or Unit tested, but it must be complete before going on to the Unit Test. Unit II has no Item checks and the student works through each chapter that the diagnosis indicates should be done. Unlike the other units the diagnosis of Unit II can be marked by the student. For units V through XI, there is no diagnosis and the students work item by item. For these units there are no unit tests, only item checks.

Criterion should be adhered to fairly closely for most students. The obvious exception to this rule will be with students for whom English is a second language. Take care to see that checks and tests are not written until all prerequisite work has been completed and the student is sure that he has mastered the objectives. In marking Communications tests, keep in mind that a lot of 'teacher judgement' is required. In many cases, only sample answers or guides for marking are provided, as it is impossible to involve students in writing, and still expect answers that will be identical to a master.

S.R.A. notes: Read the Teacher's Handbooks for the IIIa Laboratory and the Dimensions in Reading series. The multilevel system used by S.R.A. can provide an excellent individualized reading program, when used properly. While these materials were developed for secondary school students, adults find the content interesting. Progress in the reading lab., which is used

to develop reading rate and comprehension, is monitored on the student planning sheet.

The Dimensions in Reading series' stated purpose is, "to stimulate in students a lasting interest in independent reading." It is also valuable for giving the students additional practice in reading. While the rate builders and power builders of the IIIa Laboratory should be limited to one each per day. The Dimensions in Reading series can be used as the student sees fit. The student keeps his own record of this work and moves up when he finishes a level or moves up in the IIIa Laboratory.

The main thing to remember about the S.R.A. materials is that they must be used regularly to give maximum benefit. The lab. also contains materials to establish a listening program if the need exists for one.

The Communications section of this program also aims at improving the student's oral skills and his abilities to work with, and understand, those around him. Since such skills and abilities cannot be developed in isolation, some instructor facilitated group learning experiences are scheduled for the students. The objectives of these learning experiences are:

1. To provide an opportunity for the students to become familiar with school personnel, facilities, and procedures.

2. To develop specific skills such as listening for main ideas, clear thinking and speaking coherently.

3. To promote self-confidence in the students by the development of increased verbal facility.

4. To provide activities and exercises which will allow the students to refine the skills necessary to work effectively with a group of people.

The first of these objectives should be accomplished in the first week by following the procedures suggested for, "The First Week", which were covered earlier in this handbook. The Student Manual and the new intake techniques suggested elsewhere in this handbook should help later arrivals become oriented.

It is intended that oral communications be treated in as informal a manner as possible. This may not be an easy task when the students have expectations of a duplication of the formal type of situation that they once left, however the efforts expended should be well justified in increased student participation and a corresponding decrease in paternalistic 'teacher dependency'. Conventional classroom procedures, designed to develop a formal atmosphere, should be avoided. The instructor should endevour to treat the students as individuals worthy of respect and he should demonstrate this by paying very careful attention to the views they express.

It is hoped that most of the discussion carried on in oral communication will be done by the students. To encourage students to respond to the views of their peers, adopt a circular seating arrangement, which allows for increased eye contact among group members. Effective group discussion can be further encouraged by asking questions that do not allow simple answers. The best questions invite the other person to explain, in full, his thoughts on the topic. Another method of encouraging discussion is by having students respond to students. This can be facilitated by asking students questions such as "John, what do you think of Marsha's views on...?" Special training in group processes would be of value, but facilitating discussion hould not be beyond the ability of the good BTSD instructor. The checklist below may be of some value.

- ☐ Members address me no more formally than others in group
- ☐ Members frequently express real feelings
- ☐ Group starts itself at beginning of each meeting
- ☐ Sometimes members openly disagree with me
- ☐ Members address their remarks to each other rather than to me
- ☐ Group has a tendency to want to remain after the time limit has been passed
- ☐ Group makes decisions without depending on me as the final judge
- ☐ Members seem to know what goals they seek
- ☐ Members speak up without asking for my permission
- ☐ Members do not count on me alone to handle "problem members"
- ☐ "Bright ideas" originate with many members of the group
- ☐ Different individuals frequently lead the group's thinking, discussion and procedure
- ☐ Members seem to listen to each other without interrupting
- ☐ Conflicts and disagreements frequently arise, but people try to understand the nature of these and deal with them
- ☐ Members often accept insights and information from other members
- ☐ There is an absence of hostility toward me
- ☐ Members draw out and question each other to better understand their contributions

Oral Communications will require some preparation on the part of the instructor in the form of creating materials, ordering films, and so on. The following suggestions should serve as a guide for some of the most important areas of oral communications, but it is expected that the class and the instructor will be able to expand the program to suit themselves.

Wherever possible, topics for discussions should relate to subjects of concern to the student. Career Planning components of the course should suggest some topics and current concerns and events may suggest others.

1. Following Directions:

Objective: The student should be able to list reasons why it might be wise to follow directions.

Tell the students that you have a short quiz for them to do. Request that they do not consult with others, but that they work independently on the test. A copy of the test is on the following page.

When the test is completed, hold a discussion on "following directions". Almost all of us have caused ourselves untold grief because we did not follow directions, and the instructor might relate any amusing incidents he knows of, or ask the class to relate any. Ask the students why people give directions. See if the students realize that most often directions are given to make things easier--and not just for the sake of giving orders. Ask if they often give directions. Why? In what form? Do they expect them to be followed? What is the best way to give directions? Are they making the best use of the directions in the Learning Activities which they do?

NAME _____

TEST ON FOLLOWING DIRECTIONS

1. Read carefully all of the directions before doing anything.
2. Print your name, last name first on the top line following the word "NAME".
3. Draw a circle around the word "all" in direction number 1.
4. Underline the word "NAME" in direction number 2.
5. In direction number 4, draw a circle around the word "underline" and in sentence number 1, cross out the word "anything".
6. Now, draw a circle around the title of this paper.
7. Circle the numbers of sentences 1, 2, 4 and 5 and put an x over number 6.
8. In the sentence number 7, circle the even numbers, and underline the odd numbers. Put a circle around the number 4 in the fifth sentence.
9. Write "I can follow instructions" above the title of the test. Start directly above the word "test".
10. Underline the sentence you have just written.
11. Draw a square about ½" to the side of the upper left hand corner of this paper. Draw a circle around the square.
12. Cross out the numbers 8 through 12. Now circle the same numbers.
13. Put an x in the square inside the circle in the upper left hand corner.
14. Now that you have read all the directions, follow direction number 2 only. Do not follow any of the other directions; omit them entirely.
15. Please do not give this test away by any comment or exclamation. If you have read this far, just pretend you are still writing. Let's see how many people really follow directions correctly.

2. Discussion Skills
Objective: The students must be able to work together to solve problems.

The following series of activities, which will require more than one session, demonstrate the need for considering the information every group member can contribute and gives them practice in organizing to accomplish this task. The first part of the activity is the group solution of a puzzle. The second part is analysis of how well the group was able to work together. In order to ensure an adequate follow-up for this activity, select 2 observers from the class to watch and record their observations. It might be of some value if the observers have some priming in helpful and harmful behaviors. This can be found on following pages. (25-27)

To begin the game have the students seated in a circle. Stand outside the circle with the observers and give the following explanation.

> Today we are to solve a murder mystery that will help improve our discussion skills. Each of the pieces of paper I am holding contains one clue that will help you solve a murder. If you put all the facts together, you will be able to solve the mystery. You must find the murderer, the weapon, the time of the murder the place of the murder, and the motive. Any time you think you know the answers and the group agrees on the guess, you may tell me. I will only tell you whether all five answers are right or wrong. If part of your answers are incorrect, I will not tell you which answers are wrong.
>
> You may organize yourselves in any way you like. You may not, however, pass your clues around or show them to anyone else, and may not leave your seats to walk around the group. All sharing of clues and ideas must be done verbally.

The clues are all listed on the following page. If a copy of the page can be made, it is a simple job to cut the clues up. If there are more clues than students, some can take two clues. The instructor's task is to let the group organize itself. Stand in the background and observe the group's approach to the task. He should not interrupt, make gestures or give hints.

The answer to the mystery is as follows. After receiving a superficial gunshot wound from Mr. Jones, Mr. Kelley went to Mr. Scott's apartment where he was killed by Mr. Scott with a knife at 12:30 a.m. because Mr. Scott was in love with Mr. Kelly's wife.

CLUES:

It was obvious from the condition of Mr. Kelley's body that it had been dragged a long distance.

The elevator operator said that Mr. Kelley's wife frequently left the building with Mr. Scott.

The elevator operator saw Mr. Kelley go to Mr. Scott's room at 12:45 a.m.

Mr. Kelley's body was found in the park.

Mr. Kelley's blood stains were found on the carpet in the hall outside Mr. Jones' apartment.

The elevator man saw Mr. Kelley's wife to to Mr. Scott's apartment at 11:30 p.m.

When police tried to locate Mr. Jones after the murder, they discovered that he had disappeared.

Mr. Kelley's wife disappeared after the murder.

Mr. Kelley had destroyed Mr. Jones' business by stealing all his customers.

The knife found in Miss Smith's yard had Mr. Scott's fingerprints on it.

The elevator operator reported to police that he saw Mr. Kelley at 12:15 a.m.

Police were unable to locate Mr. Scott after the murder.

The elevator man went off duty at 12:30 a.m.

Miss Smith saw Mr. Kelley go to Mr. Jones' apartment building at 11:55 p.m.

When the elevator man saw Mr. Kelley, Mr Kelley was bleeding slightly, but he did not seem too badly hurt.

Miss Smith often followed Mr. Kelley.

Mr. Kelley's blood stains were found in Mr. Scott's car.

The elevator man said that Miss Smith was in the lobby of the apartment building when he went off duty.

Mr. Jones shot at an intruder in his apartment building at 12:00 midnight.

Mr. Jones had told Mr. Kelley that he was going to kill him.

When he was discovered dead, Mr. Kelley had a bullet hole in his thigh and a knife wound in his back.

Mr. Kelley's body was found at 1:30 a.m.

Mr. Kelley had been dead for one hour when his body was found, according to a medical expert working with police.

Miss Smith said that nobody left the apartment building between 12:25 and 12:45 a.m.

Only one bullet had been fired from Mr. Jones' gun.

The bullet taken from Mr. Kelley's thigh matched the gun owned by Mr. Jones.

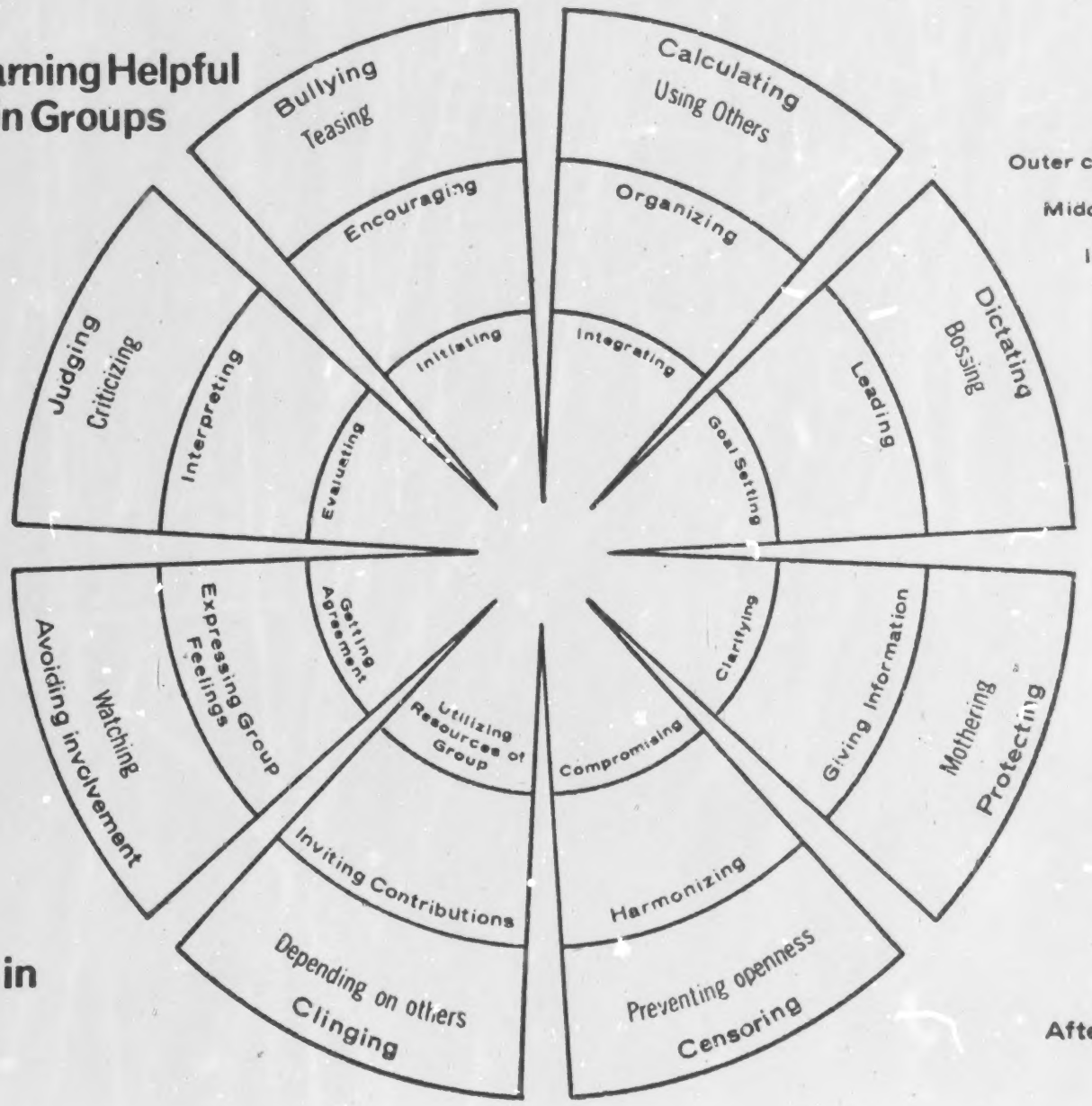
A knife with Mr. Kelley's blood on it was found in Miss Smith's yard.

A good follow-up helps to make an exercise of this nature worth while. Ask the students who participated in the problem solving to evaluate how well they had worked together. If they were relatively successful in completing the work quickly, discuss the reasons for their success. If they has problems, try to have them isolated. Encourage the participants to ask the observers for suggestions and evaluations. Some questions that might be answered by such a discussion are: Was a leader needed? Was time lost getting organized? How? Did everyone try to talk at once? Did this hinder obtaining a solution? Did everyone present their clues? Did some members of the group ignore the clues of others? Did this cause problems? Was any attempt made to urge all persons to present their clues? Were all members included in solving the problem? Did anyone monopolize the discussion?

A day or two after the students have had an opportunity to discuss the results of their first attempt at problem solving, it is a good idea to look at the classification of helpful and harmful group behavior. The chart on the following page should be used as a guide for the instructor. Ask the students to list all of the types of helpful and harmful behavior that they have observed in exercises and science groups. Ask the students to point out how helpful behavior helps to get the job done and harmful behavior only holds up progress. If the students seem slow to speak on the subject, point out how behavior like encouraging is a valuable behavior in a science group since people who are encouraged will do more work, which in turn should result in more learning for all. In direct contrast to this, forms of behavior like bullying can only slow the group up and make it less pleasant to work in. The objective whould not be to have students memorize formal classifications of behaviors, but to understand how each behavior adds or detracts from group efficiency.

From this point on students should be constantly reminded of the principles of helpful group behavior and challenged when they violate these principles. Additional remedial exercises in problem solving can be obtained from Saskatchewan Newstart "Life Skills" material or Learning Discussion Skills, by Stanford and Stanford (the murder mystery was taken from this excellent text). Groups which work well together might be introduced to more formal problem solving skills and brainstorming techniques.

LESSON: Learning Helpful Behaviors in Groups



KEY:

Outer circle — Harmful Behaviors

Middle circle — Helpful Behaviors

Inner circle — Group Task Behaviors

Helpful Behaviors in Groups

After E.L. Shostrum

A Supplement to the Chart, Helpful Behaviors in Groups

Interpretation

1. The chart shows a set of categories describing behaviors of persons in a group.
2. The outer ring contains those behaviors which people display when they use the group to satisfy their own needs.
3. The next ring shows how interest in the group and concern for other modify these behaviors. Thus a person given to bullying as his self-seeking style, as identified in the outer ring, can make an effective encourager when he develops a concern for the group, as shown in the next ring. The person whose self-seeking behavior causes him to withdraw from a discussion can, by developing a concern for the group, use his sensitivity to express group feelings.
4. The inner ring shows how concern with the task achievement modifies these behaviors further. The self seeking calculator, so aware of how to use people to his own benefit, can use that same insight to organize the group resources, and to integrate these to accomplish the task.
5. Behaviors which meet only the needs of the individual cause the group to disintegrate, or explode; behaviors which meet the needs of the individual, the group, and the task, cause the group to implode. All resources become directed to accomplishment of the task, and learning results.

3. Speaking to People

Objective: The students should be able to list several reasons for aspiring to become an effective speaker. A good stimulus for this would be to invite a member of a Toastmaster's Club to speak to the students (contact through local radio station) or obtain a film which outlines the principles of effective speaking. This could be followed up with a discussion on the reasons why it is important to be an effective speaker. Probably the students will have very little enthusiasm for becoming a good speaker, so you might point out that the degree that one is able to influence others is often directly related to the presentation rather than the content. You might ask, "When you speak, do you like people to listen to you?" Most students would respond in the affirmative and then you might ask, "Do you feel that most people repond to what is said, or how it is said?" Ask the students if they can point to examples where the how is more important than the what. Some examples of this are the fact that cars and other consumer goods are often sold more by the verbal skill of the salesman than consideration of mechanical and functional structure. Another example is in the selling of image and rhetoric rather than policy in politics.

If the discussion group is able to come to a consensus on the concept that ideas and opinions are often, perhaps too often, sold by presentation, a discussion might be established to ascertain what specific factors of presentation affect communication. With some classes this might be profitably followed up by the actual presentation of class talks. While such talks would be informal they would involve a short presentation and answers to any questions that were generated. The topics could well be related to career research. These activities should be completed before students do Unit 5 in Science in order to help them in the preparation of their presentations.

Another facet of speaking to people that deserves some attention is the interview situation. Interviewing for jobs is mentioned later in the manual, but there are many other reasons for developing effective interview skills. For such situations attending behaviors can be of great value. The following page contains a description of attending behaviors.

The following activities are designed to help the students learn more effective attending behaviors. Start by arranging the chairs in a circle and having the students seat themselves. When they are seated, explain that you would like to spend some time in looking at the sort of things that can help us communicate more effectively in an interview situation. Explain to the students how often we are placed in formal or informal interview situations and how our future is often influenced by the results of these meetings. Say to the group, "I shall demonstrate to you what I mean by attending behaviors." Tell the students to watch closely while you demonstrate good attending behaviors to them with the help of one of the students. Tell your partner to explain why he came to take this course. Allow the discussion to go for 2-3 minutes and model those behaviors covered under attending behaviors. When you have finished ask the students to comment on the interview. Make sure that they saw what you were doing and are able to see why you would. Tell the students that you expect to see them using such techniques in their future group meetings.

Basically, there are three useful attending behaviors. These are: attentive posture, eye contact, and following. How we pay attention and why we should are two questions that are answered by an examination of these behaviors.

The first one is attentive posture. To practise this, the listener must get comfortable, sit in a relaxing position and feel free to do what is comfortable and usual for him. In this way he can give full attention to the here and now situation. When a listener looks and feels comfortable, the speaker will feel that he is getting full attention. Given this kind of support, a speaker very often 'comes to life' and may speak more effectively.

The second behavior is eye contact which is looking the speaker in the eye. This doesn't mean that the listener must stare at the speaker, but he must establish eye contact. In a two-person situation (like an interview) the listener may vary his gaze by perhaps following a hand, or shifting his focal point. In a group situation, an individual may look continuously at the speaker; as the speaker's eyes move around the group, he feels their interest and attention if they are looking back. Again this helps the speaker, but the listener is also able to catch facial expressions, which can help him understand the speaker.

The third useful behavior is following. Again, this helps the speaker feel that he is being listened to, and it helps the listener understand the speaker's viewpoint. Following can be non-verbal, as in the nod of agreement, laughter at a joke,or a facial expression that reflects the speaker's statement. Following may also be verbal(particularly in an interview). The listener may express agreement or feelings, add to what is said or ask questions to clarify the speaker's intentions. Questions, such as, "What do you mean by...?" or "I don't quite understand; could you say that another way?" or "Do you mean....?" serve this purpose.

4. Debates
Objective: The students should be able to express and defend their views.

Sharp differences of opinion will often arise in the BTSD classroom. These can be channeled into debates which give the students valuable practise in presenting and defending personal views. Debates can be used in almost any topic area but it is suggested that you tie it in with career planning if possible. Some other suitable topics might be:

1. Resolved that: Common-law marriage is better than legal marriage.

2. Resolved that: Women are incapable of holding many jobs.

Some general directions for debating are carried on the next page. Each debate should be followed by a careful student analysis of what worked best. If this is done subsequent debates will show marked improvement. Some classes might find the formal restrictions of the debate to be a handicap and a panel format might be substituted.

Directions for a Debate:

1. Select the debaters. The other students participate as chairman, timer, or judges.

2. Suggested rules for a debate:
   a. Any topic to be debated is preceded by the phrase, "Resolved that:" The affirmative supports the statement and the negative agues against.

   b. Each speaker is timed and allowed only a set time to speak.

   c. The first speaker for the affirmative is followed by the first speaker for the negative, and so on. The very first speaker is granted a one minute rebuttal at the end as he has not had a chance to argue against the other side.

   d. Each speaker argues against the argument of the other side as well as presenting his own argument.

3. The chairman introduces the topic and introduces the debaters in turn.

4. The timer keeps a close watch on the time and gives the speaker a warning twenty seconds before the end of the allotted time, and gives another signal when the time is up.

5. The judges are given the task of evaluating the teams for:
   a. forceful opening

   b. clear speaking voice

   c. clear arguments

   d. effective rebuttal

   e. strong closing

It might be a good idea to have the students prepare rating sheets for use by the judges before the start of the debate. This could be done by having the students list the criteria that should be used to evaluate a debate and the creation of a numerical rating scale. If this were done the judging of the winner could be done simply by calculating the number of points obtained by both sides during the debate.

SCIENCE

As well as adhering to the general aims of BTSD in B. C., the science program is intended to do the following:

(a) To permit students to experience and succeed in new and different learning experiences, whereby they might build self-confidence and the ability to cope with change.

(b) To encourage students to develop an understanding of, and an interest in their natural and social environments.

The science program is made up of eight Core Units, which are compulsory for all students, and six Optional Units which serve as prerequisites to further training. The selection of options should be done in consultation with counsellors, or instructors of the course which the student intends to enter. However, there is nothing to prevent a student from undertaking an option because of interest in the topic.

Each Unit consists of one or more Items, which in turn consist of a set of student Objectives, a list of Learning Resources, and a number of Learning Activities. Each Unit concludes with a Unit Progress Test. Most Units also include a written assignment which is to be submitted with the completed Unit Test.

Equally important as what will be studied is how science will be studied. Since no answers are provided to most questions, and many problems require discussion, science can be studied in small groups. The problem of arranging students into groups is discussed in this Manual under "The First Week--Day Four". as well as in the Student Manual. Students also receive additional advice on how to make science groups function effectively in the Unit I Learning Activities.

When a class is operating on a continuous entry system, maintaining student science groups can be difficult. A student who starts by himself can be placed with an existing group, since the order in which the science Units are studied is not critical. The late starter can catch up on the missed Units at some future time. On the other hand, if the instructor can anticipate several new entries over a period of two weeks or so, he can have the early entries wait for the others, and when three or four new students have enrolled, they can form a new science group. Similarly, as some students complete the course and leave classes, those who remain can form new groups for study of the science options.

The role of the instructor becomes critical when a group ceases to function effectively, or breaks up completely. This occurrence, or the announcement from a student that he or she "...can't work with the group" should not be unexpected. These situations should be handled as a class problem (and not that of the instructor!). A class meeting should be held, and the whole situation with its causes, effects, and possible solutions discussed quietly and rationally with the group.

Comments should be relevant and candid, although they may not always be flattering ("John never does any work, but always copies from me...") The real situation must be brought out and discussed and a workable solution arrived at--which may include such things as promises of closer cooperation between group members; re-arrangement of some of the groups; scheduling more time for science, and so on. This principle of groups attacking and solving their own problems, and making decisions on classroom management, is an essential part of this program.

Most groups will find Units I to VIII quite straightforward and self-explanatory. The main task of the instructor will probably be to keep groups progressing at a satisfactory rate --at about one Item per week. The DuKane sound-filmstrip projector is used with Unit I, so groups will have to be instructed on its proper care and use. As soon as a few students can handle the A-V equipment satisfactorily, they in turn can instruct others.

Unit II involves the students in their first field trip. Be sure that the preparatory work prior to the trip, and the subsequent followup is completed by each group. Unit III Learning Activities also involve a field trip--the same checks should also be made by the instructor for this assignment.

Unit V must involve the entire class at the same time, so special plans will have to be made. Advanced students can skip this Unit, and return to it later, at a time when most of the rest of the class are working on it. Also recent entries to a class can jump to Unit V, and return to earlier Units when this work is completed. There also may be some advantages to forming new science groups especially for the work on Unit V--discuss it with your class. The presentations should be done as an Oral Communications exercise.

Generally the Optional units in science are more difficult for the students than are the Core units. The work is more extensive, somewhat more sophisticated, and the exams are more searching. They are intended for the more capable student in BTSD.

A careful record (on the Weekly Planning Sheet) must be kept of all test results. The average of the Unit marks forms the final mark for each student in science. Do not average the percents, but find the final mark from the raw scores. The Core mark will be out of 355 marks.

The science program will undoubtedly place great demands on the skill and resourcefulness of the instructor, but if successfully run, can provide a valuable and rewarding experience for the student.

An example of a large group science activity is shown on page 34.

SCIENCE ACTIVITY

(A proven, good afternoon activity)

Arrange a number of science activities:-

Example:
- Pulleys
- Concave Mirror
- Flask & Glass tube. Expansion of liquid. } Circuit
- Inclined Plane
- Reference in Encyclopedias, Science Books etc.

Introduce

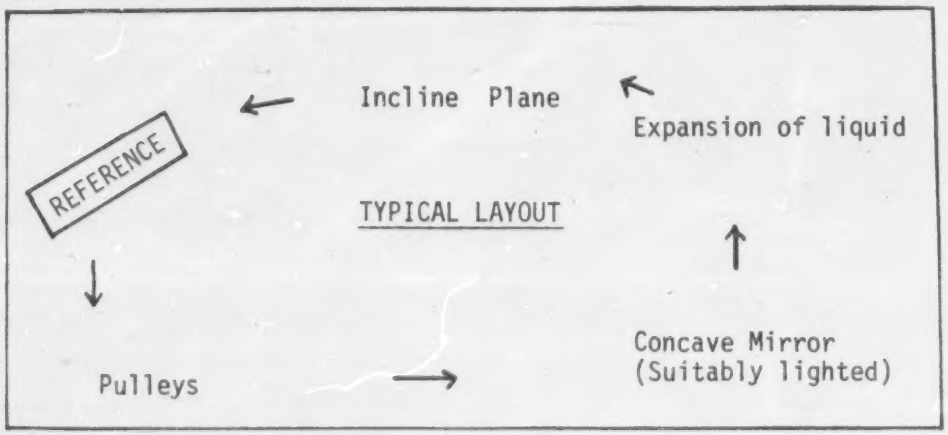
Each activity should be explained -- "This is the way to proceed. See what you can discover."

Instructor should circulate to demonstrate progress and convey the idea of how to proceed at each experiment. Group cooperation should be encouraged and delegation of specific tasks for the good of the group indicated.

The reference section is to be used for further information. Individual students can share information. Instruction in note-taking and reference work should precede this activity -- probably in the Communications part of the course.

One writing table is required for the reference section. Each activity should be set up conveniently -- four corners of the room or at the most suitable locations for student access.

Time is divided according to the number of activities in the set time (1/2 or 3/4 hour for each activity) Complete reference work and writing up of experiments will continue on following days at student's discretion.



Career Planning:

One of the objectives of BTSD is to "motivate toward realistic vocational goals", and "encourage attitudes and habits that will enhance the trainees prospects of success...." Students referred to BTSD are supposed to have some vocational goals which justify their presence in the course. In practice it seems that many of these goals are unrealistic and, in some cases, almost nonexistant. It should be considered the responsibility of every studentto have clearly defined and realistic vocational vocational goals. Such goals need not be rigid, but they should be based on the best career information available.

The instructor should have a clear idea of what everyone's career plans are. The best way to obtain this information is during a private interview with the student as you check through planning sheets. In this way the goals can be recorded in the anecdotal record. When the instructor perceives weak or unrealistic career plans, which will be often, the studen should be sent to gather more information. It is part of the student's job to search out career information from all available sources, such as Manpower counsellors, vocational school consellors, trades instructors, employers, etc. Most faulty career plans will be changed by the student, if he is able to gather enough accurate information. While the instructor is expected to help the student bydirecting him to career information, the student must find it for himself.

All BTSD students should be exposed to Canada Manpower's Creative Job Search program. Creative Job Search consists of two 1½ hour sessions, spread about one week apart. The program aims at refining students' job search skills. The first session consists of a presentation on the factors that operate in the job market and the explanation of techniques that are of value in job seeking. The second session is devoted to improving resumes and some preparation must be done for the second session. It would be best to introduce Creative Job Search at a point when several individuals were about to complete the course. With the policy of continuous entry and exit, this could be accomplished by putting the course on two or three times every six months.

Many Canada Manpower counsellors are trained to present the program and contacts for it should be made at the local office. If this presents any problems, contact Mr. Doug Tang at the main office at 1155 West Pender St., Vancouver, B.C.

On the following pages are exercises designed for group learning situations. Their aim is to assist students in career planning but by careful handling they will be of value in the development of oral communications skills. In addition to this, Unit VII, Item C and all of Unit VIII in the Communications program are related to this type of career study and the instructor would be wise to familiarize himself with them.

1. Career Goals:
Objective: The students should be able to list several advantages to knowing one's career goal and list factors to be considered in the forming of career goals.

A discussion on this topic could be stimulated by inviting a Manpower counsellor to speak to the students on the subject or a presentation of a film such as Wayne and Shuster Look at Technical Training in Canada (NFB #10 6C0166017).

If a speaker is used he might be asked to join a discussion group which has the goal of listing the factors to be considered when an individual makes career decisions. If the students are hesitant about speaking, start by asking leading questions, such as, "Mr. Counsellor suggested that knowledge of occupational goals makes educational planning easier. How might educational planning affect one's career goals?" Some such questions can be found on page 21 and 22 of Exploring Occupations. If the suggestions generated during the discussion are recorded, copies can be made and distributed to the class. If the film is used for a stimulus, a similar discussion can be built around the ways in which a person decides his future, given such a multitude of choices.

2. Work Skills:
Objective: The students should be able to list those marketable skills that they possess and list several potential sources of employment for those skills. In addition to this they should be able to locate sources of employment for a specific occupation.

Sometimes students have skills they fail to recognize. The discovery of some marketable skills provides a lift for the person making the discovery; such emotional satisfaction helps give gives the student enthusiasm for returning to the work force. The survey of marketable skills introduces the student to a way of thinking about jobs which relates to skill training: if jobs consist of skills, then it follows that training in skills prepares one for the job.

Ask a student to volunteer information about one of their past jobs. Try to pick typical jobs, such as construction labourer, waitress, etc. Lead the class in brainstorming a list of all the skills in that job. For a waitress such a list would include: taking orders, cleaning tables, setting tables, greeting the public, handling any complaints, giving information to travell clean up work, using the cash register, making up bills, training new staff, taking stock, etc. In addition to the obvious skills don't overlook such things as getting along with other people, organizing, directing others, taking directions, accepting responsibility, etc. If this task is well done, almost any job will break down to an astronomical number of specific skills. When the student's begin to realize that many jobs have similar skills, ask the students what other jobs this experience might be used for. Returning to our example of the waitress, her skills might be put to work in many jobs. She might become a store clerk, receptionist, bank teller, booking agent,

chambermaid, cashier, etc. If the students have trouble, you might make suggestions but try to have them see that the skills of one job can often be used on many other jobs.

When the list of possible jobs has been generated, pose another question, "Where would you look for a job if you wanted any one of the above?" Returning to the waitress example, if we said her skills would serve her well as a clerk in a store the list of places to apply for work would be the sum total of all the retail outlets in the area! When the students realize how many jobs can be done with the same set of skills and how many sources of employment there are for each type of job, they will start to get an idea of their own potential.

3.Applying for a Job:
Objective: The students should be able to use "Help Wanted" ads and present themselves in a positive fashion to a prospective employer in an interview situation.

Distribute "Help Wanted" sections from current newspapers and ask the students to study the advertisements. Ask, "What facts do the ads seem to require of an applicant and what facts do they give about the job?" The students should develop a list of items such as: age education, health, references, marital status, hours of work, special certificates, special interests, ability to meet people, energy and ambition, company benefits, date available, apply in person, telephone, apply in writing, send resume and so on.

Tell the students, "When an employer interviews you for a job, he looks for someone to do a job for him. He does not hire you because you need a job. You must show an employer that he needs your services. How would you do this?" Ask the students for a volunteer to role play an interview situation with you. Prepare the volunteer for the role play by talking about the job the student wants and the job interview: Say, "Imagine that you have come to me to apply for the job. As you come up, you see that someone else has just come up to speak to me. Now get yourself ready. You see that I am pretty busy, so get ready to introduce yourself and get right to the point."

Following the role-play write this acronym on the flip chart:

T-Time
I-Introduction
P-Prove

Say,"This TIP can help you make an effective interview. In an interview you have to come on Time; you must Introduce yourself and Prove to the employer that you are the person for the job. Tell the students that proving to an employer that they have the abilities and attitudes that he needs is the most important part of a job interview. Ask the students what employers want in an emplyee. Refer them to what they found in the advertisements and give them a copy of the list on the next page.

The Questions Most Frequently Asked by Employers

1. What are your future vocational plans?
2. How do yo spend your spare time?
3. In what position are you interested?
4. Why would you like to work for our company?
5. What jobs have you held? Why did you leave them?
6. What do you know about our company?
7. What qualifications do you have that make you feel that you would do well?
8. What are your ideas on salary?
9. Do you prefer any specific location?
10. Why would you like this type of job?
11. Are you looking for a permanent or temporary job?
12. Do you prefer working with others or by yourself?
13. What kind of boss do you prefer?
14. Can you take instructions without feeling upset?
15. How did previous employers treat you?
16. What have you learned from some of the jobs you have held?
17. Can you get recommendations from previous employers?
18. Have you ever changed your major field of interest?
19. What do you know about opportunities in this field?
20. How long do you expect to work?
21. Have you saved any money?
22. Do you like routine work?
23. Do you like regular hours?
24. Are you eager to please?
25. What do you do to keep healthy?
26. Explain the duties of your last job?
27. Have you ever supervised people?
28. Have you ever had a serious injury or illness?
29. Are you willing to go where the company sends you?
30. What types of people seem to "rub you the wrong way"?
31. Do you enjoy sports? Which ones?
32. What jobs have you enjoyed the most? The least? Why?
33. What are your own special abilities?
34. Would you prefer to work for a large company or a small one?
35. Do you like to travel?
36. Do you like to work with the public?
37. How about overtime work?
38. What have you done which shows initiative and willingness to work?
39. How much education do you have?
40. Have you taken any special training for this type of work?

Depending upon the time available, this activity can be followed by small group discussions on how to prove to an employer that they have the abilities and attitudes he needs. Another activity might involve all students role-playing interviews. If some of the students have never participated in a role play before, explain the need to "put themselves into the situation," and help them do so by describing the situation in some detail. Suggest how they might feel. After each interview, ask for feedback from other students about the interviewee's effectiveness and how he might improve his abilities in selling himself.

4. Work Behavior:
Objective: The students should be able to list the types of behavior that employers look for in an employee.

Advance preparation should be made with a group of employers representative of the local community to serve as resource personnel in a panel discussion on the topic, "What do employers look for in their employees?"

Tell the students that you have invited a group of employers to the class to discuss what they expect of an employee. Tell them the names of those invited and their field of employment. Tell the students that when the employers come, each student should introduce himself to the employers. Before the employers arrive, ask the students what qualities and skills and employer looks for in a prospective employee, and list the ideas on a flip chart. They may suggest; job skills, personal skills, appearance and grooming, how the employee would fit in with other staff, attitudes to unions and collective bargaining, age and so on. After the discussion ask,"What do we want to know about the employers when they come?" List the questions.

Arrange the chairs in one large circle providing seating space for the employers. Invite the employers in and ask them to take a chair. After everyone is settled introduce yourself and ask the employers and students to do likewise. Review the reasons for having the employers present in the group, namely to help the students discover what an employer expects of an employee.

If the panel has prepared themselves they will probably be able to express themselves in turn. It might be a good idea to suggest that the students note the important points for future reference. When each employer has outlined his views the instructor should attempt to have them discuss the points each other has made with statements such as, "Mr. ___, I noticed that ..." or "You all seem to agree that..." or "What do the rest of you feel about..."

When the topic has been covered, ask the students if the questions they had listed were all answered. If the students do not ask questions themselves, encourage them by asking specific questions such as, " Frieda, do you feel that you have a clear idea of employers expectations on standards of dress in the office" Try to see that the students obtain answers to all their initial questions. See that the employers are thanked for their efforts before they leave.

5. Other Suggestions:

a. Field trips to local employers.
b. Guided tours of colleges and vocational schools.
c. Guest speakers from unions, apprenticeship branch, etc.

APPENDIX III

Sample Units in MATHEMATICS

COMMUNICATIONS

SCIENCE

Phase I 1973

Mathematics Diagnosis

UNIT III: RATIO AND PROPORTION Name: _____

Date: _____

	OBJECTIVE
1. Give an example of a ratio. _____	A-1
2. Give an example of a proportion. _____	A-3
3. Write the ratio of 3 to 4 in two ways. _____ _____	A-2
4. Write the proportion 3 is to 4 as 9 is to 12 in two ways. _____ _____	A-4
5. If you had 42 items correct out of 49 on a test, what is the ratio of right to wrong items? Show your work.	B-1, C-1, C-2
6. Find the number for "n" which would make each of the following a true sentence.	B-2
a. $\frac{6}{4} = \frac{n}{6}$, n = _____	
b. $\frac{5}{n} = \frac{4}{12}$, n = _____	
7. If a recipe calls for 2 cups of flour and ½ cup of butter, how much butter would be required if you used 3 cups of flour? Show your work.	B-3, C-1, C-2

8. If 5 pounds of beef cost $9,00, how much will 7 pounds cost? Show your work.

B-3, C-1, C-2

MATHEMATICS

UNIT III: RATIO AND PROPORTION

ITEM A : READING AND WRITING

OBJECTIVES

The student must be able to:

1. Define ratio by giving an example.
2. Write ratios in the form $\frac{a}{b}$ and a:b.
3. Define a proportion by giving an example.
4. Write proportion in the form $\frac{a}{b} = \frac{c}{d}$

   and a:b = c:d

NOTE: "Proportion means the same as "equivalent ratios"

LEARNING RESOURCES

Books: B Math, Pitman
Basic Mathematics, Bouman and Lindsay
Mathematics, A Basic Course, Cambridge Book Company
Refresher Mathematics, Stein
General Mathematics, Ginn and Company

LEARNING ACTIVITIES

If you missed either objective 1 or 2 on the Diagnosis, get a copy of B Math and read about "The Ratio of Two Numbers" on pages 56 and 57. Then read the examples given on page 221 in Basic Mathematics. Do exercise 8-1 at the top of page 222 and check your answers with those in the back of the book.

If you missed either objective 3 or 4 on the Diagnosis, get a copy of B Math and read about "Proportion - Equal Ratios" on pages 58 and 59. Then read the examples given on page 222 under "Equivalent Ratios" in the book Basic Mathematics. After reading the example in exercise 8-2, do questions a-l at the top of page 223.

Then read the information below exercise 8-2 on page 223 and do exercise 8-3, questions a-l. Read the information at the bottom of page 223 and at the top of page 224. Check your answers to all the exercises with those in the back of the book.

If your work is correct to this stage, you are ready to write Item Progress Check III A, Form 1. If you need further assistance, use one or more of the following:

Objective	Source Materials	Page(s)	Content
1,2	Refresher Mathematics	138, 516 517	information & exercises
3,4	"	517, 520	"
1,2	Mathematics, A Basic Course	158, 159	" "
3,4	"	159 - 161	"
1,2,3,4	General Mathematics	342-344	"

After you have written Item Progress Check III A, Form 1, and have met the criterion, go on to the next Item as indicated on your Diagnosis. If you do not meet the criterion, select additional work from the above table and, after completing it, write Item Progress Check III A, Form 2. If you now meet the criterion, go on to the next Item shown on your Diagnosis. If not, see your instructor.

If you have now completed all the work in Unit III, you are ready to write Unit III Progress Test, Form 1. If you meet the criterion, do Diagnosis IV. If not, see your instructor.

Mathematics Item Progress Check

UNIT III: RATIO AND PROPORTION Name: _____

ITEM A : READING AND WRITING Date: _____

Form 1

Criterion:	6 / 6
Score:	___/___

(1) 1. Give an example of a ratio. any ratio such as $\frac{1}{2}$, $\frac{3}{2}$, ...

(2) 2. Write the ratio of 5 to 3 in two ways.

$\frac{5}{3}$ 5 : 3

(1) 3. Give an example of a proportion. any proportion such as $\frac{1}{2} = \frac{2}{4}$

(2) 4. Write the proportion 1 is to 3 as 4 is to 12 in two ways.

$\frac{1}{3} = \frac{4}{12}$ 1 : 3 = 4 : 12

Mathematics Item Progress Check

UNIT III: RATIO AND PROPORTION Name: _____

ITEM A : READING AND WRITING Date: _____

Form 2

Criterion:	4 / 5
Score:	___/___

(1) 1. Give an example of a ratio. any ratio such as $\frac{1}{2}, \frac{3}{2}, \ldots$

(1) 2. The ratio of 1 to 3 can be written $\frac{1}{3}$.
Write it another way. 1:3

(1) 3. Give an example of a proportion. any proportion such as $\frac{1}{2} = \frac{2}{4}$

(2) 4. Write the proportion 5 is to 2 as 10 is to 4 in two ways. $\frac{5}{2} = \frac{10}{4}$ 5:2 = 10:4

MATHEMATICS

UNIT III: RATIO AND PROPORTION

ITEM B : OPERATIONS

OBJECTIVES

The student must be able to:

1. Calculate the ratio of two quantities and write it as a common fraction in simplest terms.
2. Solve proportions in which one ratio is incomplete.
3. Use ratio and proportion in solving word problems, using the five steps.

LEARNING RESOURCES

Books:

B Math, Pitman

Basic Mathematics, Bouman and Lindsay

Mathematics, A Basic Course, jCambridge Book Company

Refresher Mathematics, Stein

General Mathematics, Ginn and Company

LEARNING ACTIVITIES

If you missed objective 1 on the Diagnosis, get a copy of B Math and read about "The Ratio of Two Numbers" on pages 56 and 57. Then do exercise 8-4, question 1 (any 10 questions) on page 224 of the book Basic Mathematics. Check your answers with those in the back of the book.

If you missed objective 2 on the Diagnosis, get a copy of B Math and read about "Proportion-Equal Ratios" on pages 58 and 59. Then read the information on the bottom of page 224 and top of page 225 in the book Basic Mathematics. Do exercise 8-5 on page 225 and check your answers with those in the back of the book.

Then read about the "Ratio Test" on pages 231 and 232 and do exercise 8-7. Check your answers.

If you missed objective 3 on the Diagnosis, get a copy of B Math and read about "Solving Problems of Proportion" on pages 60 and 61. Then do problems 5,6 and 10 on page 61. Turn to page 232 in the book Basic Mathematics and read about "Uses of Ratio" to page 234. Then do exercise 8-8 on pages 234 to 235 doing questions 1 (a-e), 2 (a-c), 3 (a-d), 4 (a-c) and 5 (a-d). Check your answers with those in the back of the book.

If your work is correct to this stage, you are ready to write Item Progress Check III B, Form 1. If you need further assistance, use one or more of the following:

Objective	Source Materials	page(s)	content
1	Refresher Mathematics	516,517,138	information & exercises
2	"	517-520	"
3	"	521	problems
1,2,3	Mathematics, A Basic Course	158-161	information & exercises
1,2,3	General Mathematics	342-349	"

After you have written Item Progress Check III B, Form 1, and have met the criterion, go on to the next Item as indicated on your Diagnosis. If you do not meet the criterion, select additional work from the above table and, after completing it, write Item Progress Check III B, Form 2. If you now meet the criterion, go on to the next Item shown on your Diagnosis.

If you have now completed all the work in Unit III, you are ready to write Unit III Progress Test, Form 1. If you meet the criterion, do Diagnosis IV. If not, see your instructor.

Mathematics Item Progress Check

UNIT III: RATIO AND PROPORTION Name: _____

ITEM B : OPERATIONS Date: _____

Form 1

Criterion:	8 / 8
Score:	___/___

(2) 1. Write these as rations in simplest form. Show your work.

a. Ratio of your age to your mother's if you are 26 and she is 52?

26:52 1:2 or $\frac{1}{2}$

b. Ratio of people per square mile if there are 10,000 people in 200 square miles?

$\frac{10,000}{200} = \frac{100}{2} = \frac{50}{1}$ or 50:1

(4) 2. Complete the following by putting the correct number in the ( ).

a. $12:3 = (8):2$ $\frac{\overset{4}{\cancel{12}}}{\cancel{3}} = \frac{?}{2}$ $? = (4)(2) = 8$

b. $20:(15) = 8:6$ $\frac{20}{?} = \frac{8}{6}$ $? = \frac{\overset{5}{\cancel{20}}(6)}{\cancel{8}_{2}} = 15$

c. $\frac{6}{15} = \frac{4}{(10)}$ $? = \frac{\overset{5}{\cancel{10}}\overset{2}{\cancel{(4)}}}{\cancel{6}_{3}} = 10$

d. $\frac{(18)}{42} = \frac{30}{70}$ $? = \frac{\overset{6}{\cancel{42}}(30)}{\cancel{70}_{10}} = 18$

Problems: In the space below, show the work you do to solve problems. One mark is for your work, and one mark is for the correct answer.

(2) 3. A recipe calls for 8 cups of flour and 12 tablespoons of shortening. How many tablespoons of shortening should be used with 6 cups of flour?

$\frac{8}{6} = \frac{12}{?}$ $? = \frac{\overset{3}{6}(\overset{3}{12})}{8_{2}} = 9$

9 tablespoons of shortening

Mathematics Item Progress Check

UNIT III: RATIO AND PROPORTION Name: _____

ITEM B : OPERATIONS Date: _____

Form 2

Criterion: 7 / 8
Score: ___/___

(2) 1. Write the following ratios in simplest form. Show your work.

a. Ratio of right to wrong answers if you got 12 out of 15 correct. Total 15, right 12, wrong 3 $\frac{12}{3} = \frac{4}{1}$ or 4:1

b. Ratio of men to women in a class if there were 6 men and 18 women. $\frac{6}{18} = \frac{1}{3}$ or 1:3

(4) 2. Put the correct number in the ( ) to make these proportions correct.

a. $\frac{3}{2} = \frac{24}{?}$ $? = \frac{2(24)}{3} = 16$ 3:2 = 24:(16)

b. $\frac{?}{7} = \frac{27}{63}$ $? = \frac{7(27)}{63} = 3$ (3):7 = 27:63

c. $\frac{3}{5} = \frac{(24)}{40}$ $\frac{3}{5} = \frac{?}{40}$ $? = \frac{3(40)}{5} = 24$

d. $\frac{9}{15} = \frac{(21)}{35}$ $\frac{9}{15} = \frac{21}{?}$ $? = \frac{15(21)}{9} = 35$

Problem: In the space below, show the work you do to solve problems. One mark is for your work, and one mark is for the correct answer.

(2) 3. If Mary bought a dozen (12) oranges for 40¢, what would she have to pay for 15 oranges?

$\frac{12}{15} = \frac{40¢}{?}$ $? = \frac{15(40)}{12} = 50$

$\therefore$ cost is 50¢

MATHEMATICS

UNIT III: RATIO AND PROPORTION

ITEM C : PROBLEM SOLVING

OBJECTIVES

The student must be able to:

1. Apply the steps in solving a problem - that is -
   a. Write what is to be found.
   b. Write a word sentence using given facts and telling what is to be found, including what operations are to be used.
   c. Write a number sentence in symbols using given facts and telling what is to be found.
   d. Solve the number sentence. (Calculate what is not known)
   e. Write the answer to the original problem.

2. Apply each or all of the above in solving a given problem.

LEARNING RESOURCES

Books: B Math, Pitman

Basic Mathematics, Bouman and Lindsa,

Refresher Mathematics, Stein

General Mathematics, Ginn and Company

LEARNING ACTIVITIES

If you missed objective 1 or 2 on the Diagnosis, get a copy of B Math and read about "Solving Problems of Proportion" on pages 60 and 61. Then do problems 5,6 and 10 on page 61. Turn to page 232 in the book Basic Mathematics and read about "Uses of Ratio" to page 234. Then do exercise 8-8 on pages 234 to 235 doing questions 1 (f-j), 2 (d-f), 3 (e-g), 4 (d-f) and 5 (e-g). Check your answers with those in the back of the book.

If your work is correct to this stage, you are ready to write Item Progress Check III C, Form 1. If you need further assistance, use one or more of the following:

Objective	Source Materials	page(s)	content
1,2	Basic Mathematics	243-245	information & problems
1,2	Refresher Mathematics	138, 521	problems
1,2	General Mathematics	344, 345	information & problems
		348, 349	"

After you have written Item Progress Check III C, Form 1, and have met the criterion, you are ready to write Unit III Progress Test, Form 1. If you meet the criterion on Unit III Progress Test, you are ready to do Diagnosis IV. If not, see your instructor.

If you do not meet the criterion on Item Progress Check III C, Form 1, select additional work from the above table and, after completing it, write Item Progress Check III C, Form 2. If you do not meet the criterion, see your instructor.

If you now meet the criterion, you are ready to write Unit III Progress Test, Form 1. If you meet the criterion on the Unit Test, do Diagnosis IV. If not, see your instructor.

Mathematics Item Progress Check

UNIT III: RATIO AND PROPORTION Name: _____

ITEM C : PROBLEM SOLVING Date: _____

Form 1

Criterion:	8 / 8
Score:	1 /

Problems: In the space below, show the work you do to solve problems. One mark is for your work, and one mark is for the correct answer.

(2) 1. In a class of 18 students, $\frac{8}{9}$ of them were present. How many students were present?

$\frac{8}{9} = \frac{?}{18}$ $\quad ? = \frac{8(18)}{9} = 16$

16 students were present

(2) 2. A hockey team plays 18 games and wins 10. What is the ratio of games lost to games played? Give your answer in simplest form.

games played 18
games won 10
games lost 8

$\frac{8}{18} = \frac{4}{9}$

The ratio is $\frac{4}{9}$ or 4:9

(2) 3. If a twelve foot long piece of lumber costs $2.16, how much would a 5 foot piece cost?

$\frac{12}{5} = \frac{2.16}{?}$ $\quad ? = \frac{5(2.16)}{12} = \frac{10.80}{12} = 9$

The cost would be $.90 or 90¢

(2) 4. If 11 acres of land cost $2,255, what will 20 acres cost at the same price?

$\frac{11}{20} = \frac{2255}{?}$ $\quad ? = \frac{20(2255)}{11} = \frac{45100}{11} = 4100$

The cost is $4100

Mathematics Item Progress Check

UNIT III: RATIO AND PROPORTION Name: _____

ITEM C : PROBLEM SOLVING Date: _____

Form 2

Criterion:	7 / 8
Score:	___/___

Problems: In the space below, show the work you do to solve problems. One mark is for your work, and one mark is for the correct answer.

(2) 1. At one time, haircuts cost 75¢. Now they are $3.00. What is the ratio of the cost of haircuts in the past to the cost now?

$\frac{.75}{3.00} = \frac{75}{300} = \frac{1}{4}$

The ratio is $\frac{1}{4}$ or 1:4

(2) 2. During the first 126 games of the season, the football team won 28 games. If this ratio is kept up, how many games will the team win in a total season of 162 games?

$\frac{126}{162} = \frac{28}{?}$ $\quad ? = \frac{9(28)}{7} = 36$

$\frac{27}{9}$

They would win 36 games

(2) 3. Find the cost of the following:

6 packages of gum at 3 for 10¢ | .20
9 bars of soap at 3 for 56¢ | 1.68
5 cans of beans at 3 for 54¢ | .90

$\frac{3}{6} = \frac{10}{?}$ $\quad ? = 20¢$

$\frac{3}{9} = \frac{56}{?}$ $\quad ? = 1.68$

$\frac{3}{5} = \frac{54}{?}$ $\quad ? = 90¢$

(2) 4. If 3 out of every 8 Cadillacs were recalled because of defects in 1972; how many of the total 5,768 cars were recalled?

$\frac{3}{8} = \frac{?}{5768}$ $\quad ? = \frac{3(5768)}{8} = 2163$

67

2163 cars were recalled

Mathematics Unit Progress Test

UNIT III: RATIO AND PROPORTION Name: _____

Form 1 Date: _____

Criterion:	10/ 12
Score:	__/__

(2) 1. Write the ratio of 7 to 5 in two ways.

$\frac{7}{5}$ _____ 7:5

(2) 2. Write the proportion 5 is to 8 as 15 is to 24 in two ways.

$\frac{5}{8} = \frac{15}{24}$ _____ 5:8 = 15:24

(4) 3. Put the correct number in the ( ) to make these proportions correct.

a. 5:9 = 20: (36) $\frac{5}{9} = \frac{20}{?}$ $? = \frac{9(20)}{5}$ $? = 36$

b. (3):4 = 18:24 $\frac{?}{4} = \frac{18}{24}$

c. $\frac{11}{35} = \frac{33}{(\ 100\ )}$ $\frac{11}{35} = \frac{33}{?}$ $? = \frac{35(33)}{11}$ $= 105$

d. $\frac{6}{7} = \frac{(48)}{8}$

Problems: In the space below, show the work you do to solve problems. One mark is for your work, and one mark is for the correct answer.

(2) 4. A farmer had the following livestock; 3 sheep, 6 pigs, 12 cows, and 16 horses. Give answers in simplest form for the ratio of:

a. horses to sheep $\frac{16}{3}$ or 16:3

b. pigs to cows $\frac{6}{12} = \frac{1}{2}$ or 1:2

c. pigs to horses $\frac{6}{16} = \frac{3}{8}$ or 3:8

(2) 5. A recipe called for 6 ounces of lemon concentrate for every 24 ounces of water. If 24 ounces of concentrated lemon were used, how much water should be added?

$\frac{6}{24} = \frac{24}{?}$ $? = \frac{24(24)}{6} = 96$

96 ounces of water

Mathematics Unit Progress Test

UNIT III: RATIO AND PROPORTION

Name: _____

Form 2

Date: _____

Criterion: 10 /12

Score: ___/___

(2) 1. Write the ratio of 13 to 7 in two ways.

$\frac{13}{7}$ 13:7

(2) 2. Write the proportion 2 is to 7 as 10 is to 35 in two ways.

$\frac{2}{7} = \frac{10}{35}$ 2:7 = 10:35

(4) 3. Put the correct number in the ( ) to make these proportions correct.

a. 3:8 = 15: (40) $\frac{3}{8} = \frac{15}{?}$ $? = \frac{8(15)}{3} = 40$

b. (20):12 = 5:3 $\frac{?}{12} = \frac{5}{3}$ $? = \frac{12(5)}{3} = 20$

c. $\frac{2}{7} = \frac{8}{(28)}$ $\frac{2}{7} = \frac{8}{?}$ $? = \frac{7(8)}{2} = 28$

d. $\frac{3}{(20)} = \frac{12}{80}$ $\frac{3}{?} = \frac{12}{80}$ $? = \frac{3(80)}{12} = 20$

Problems: In the space below, show the work you do to solve problems. One mark is for your work, and one mark is for the correct answer.

(2) 4. A pet shop had 4 kittens, 2 rabbits, 10 mice and 8 canaries. Give answers in simplest form for the ratio of:

a. canaries to kittens $\frac{8}{4} = \frac{2}{1}$ or 2:1

b. rabbits to mice $\frac{2}{10} = \frac{1}{5}$ or 1:5

c. rabbits to canaries $\frac{2}{8} = \frac{1}{4}$ or 1:4

(2) 5. The anti-freeze mixture for a car called for 2 pints of anti-freeze for every 5 pints of water. If 6 pints of anti-freeze are used, how many pints of water are needed?

$\frac{2}{6} = \frac{5}{?}$ $? = \frac{6(5)}{2} = 15$

15 pints of water.

Communications Diagnosis

UNIT I: WORKING WITH WORDS

NAME: _____

DATE: _____

S.I.N. No. _____

Section A: Answer the following questions.

Schooling:

What grade did you last complete in school? _____

Where? _____

How many years ago? _____

Have you taken any training or courses since then? _____

Describe these briefly. _____

_____

_____

Language:

What was the first language you learned? _____

If other than English, how long have you been speaking English? _____

How long have you been writing English? _____

What other languages do you speak? _____

Have you any difficulty understanding what you are reading? when you read a newspaper? _____

Do you subscribe to, or regularly buy a newspaper? _____

About how much time do you spend reading books or magazines during a week? _____

Other:

What jobs have you held recently? List them.

_____

_____

_____

_____

What do you want to do after completing this course? Outline your plans briefly. _____

_____

_____

_____

Section B: Write the plural forms of each of the following words. If the word is already plural, write P in the blank.

1. ditch _____
2. nephew _____
3. elk _____
4. city _____
5. bus _____
6. pants _____
7. waif _____
8. phantom _____
9. louse _____
10. radio _____
11. wolf _____
12. fox _____
13. spy _____
14. lamb _____
15. step-brother _____
16. tomato _____
17. tray _____
18. life _____
19. saucer _____
20. dice _____

Section C: Write contractions for these words.

1. they had _____
2. it has _____
3. I could _____
4. he is _____
5. are not _____
6. I have _____
7. will not _____
8. who will _____

Write the words that these contractions are formed from.

9. we'll _____
10. wasn't _____
11. they're _____
12. shouldn't _____
13. doesn't _____
14. its' _____
15. I'd _____
16. who's _____

Write abbreviations for these words.

17. ounce _____
18. Newfoundland _____
19. government _____
20. tablespoon _____
21. delivery _____
22. June _____
23. board feet _____
24. street _____

Write the words that these are abbreviations for.

25. N.D.P. _____
26. Tues. _____
27. m.p.h. _____
28. eg. _____
29. doz. _____
30. incl. _____
31. Feb. _____
32. Ltd. _____

Section D: Write the prefix (if any), root word and suffix (if any) for each of the following words.

		Prefix	Root Word	Suffix
example:	*unsinkable*	*un*	*sink*	*able*
1.	impressed			
2.	ineffective			
3.	reliable			
4.	independent			
5.	removed			
6.	exploration			
7.	recycle			
8.	unhappy			

Underline the prefix or suffix in each of the following words and briefly explain the meaning of the part you underlined.

9. helpful _____
10. deform _____
11. repaid _____
12. slowest _____

Add a prefix or suffix to the underlined word, so that it makes sense in the sentence. Write the complete word in the blank at the right.

13. It is *wise* to drive after you have been drinking.(_____)
14. I have been on my own and quite *dependent* for(_____) four years.
15. He was *satisfied* with the poor quality of his(_____) purchase.
16. A dull knife is *use* on a hunting trip. (_____)
17. He was very *care* to do his work correctly. (_____)
18. Tom is *short* than Bill. (_____)
19. George *paid* the money that we had loaned him. (_____)
20. Mary is the *happy* girl in that group. (_____)

Section L: Write a synonym for each of these words.

1. correct _____
2. silent _____
3. huge _____
4. find _____
5. spent _____
6. nervous _____

Write an antonym for each of the following.

7. whisper _____
8. angry _____
9. frigid _____
10. timid _____
11. risky _____
12. temperamental _____

In the space provided, write a synonym for the underlined word, to fit the context of the sentence.

13. The snow had already *melted*, but the ice on the lake had not begun to _____.
14. A *toboggan* is a kind of _____.
15. This *exam* is not the last _____ you will write.
16. Her favorite *perfume* is the _____ of lilies.

In the space provided, write an antonym for the underlined word, to fit the context of the sentence.

17. The main highway was *straight*, but the back roads were _____.
18. The *old* man spoke quietly to his _____ son.
19. Somedays, you have only *started* your work when its time to _____ for the day.
20. The principal *allowed* us only one field trip; he _____ the others we had planned.

Circle the correct homonyms in each sentence below.

21. We went walking (threw, thru, through) the woods.
22. We got caught in a (reign, rain, rein) storm.
23. Almost (to, too, two) hours (passed, past, paste) before we could go home.
24. There were (to, too, two) many people in the line up.
25. (Who's, Whose) going to the baseball game?

In the following paragraph, circle the incorrect homonyms that are used. Write the correct homonyms (in order) on the spaces at the right.

It is a good idea too have sum idea of the kind of job you wood like. You can choose coarses that will aide you in preparing fore you're employment. You will also know wear to look and witch ads to answer. When you have the chance, you will go into an interview knowing weather or knot you will succeed.

Communications

UNIT I: WORKING WITH WORDS

ITEM A: BASIC ENGLISH

OBJECTIVES

The student must be able to:

1. Read and write English at a level necessary for beginning Level II-III training.

LEARNING RESOURCES

Books: Basic Reading Skills Workbook

Basic Reading Skills, Teacher's Edition (answer key)

Cassette Tapes: Set A Word Study - tapes to accompany Basic Reading Skills

Acetate sheets and felt pens

LEARNING ACTIVITIES

For your work in this Item you will use the Basic Reading Skills workbook, together with a set of cassette tapes. Do two or three tapes each day, together with the related Workbook assignments. The Item is finished when you have completed to page 58 and tape 32.

Begin by reading pages 4 to 6 in the workbook. Begin tape 1 when you are ready to start on page 7.

When you do the workbook exercises, place the acetate (plastic) sheet over the page, and fill in the blanks, writing on the sheet with a felt pen. When you have completed and corrected your exer-

cise, wipe the sheet clean with a damp paper towel. Use only the pens provided (others may not erase), and do not mark the workbook.

Since you do six "Check Yourself" exercises in this Item as you go through it, there is no Item A Progress Check at the end. Go directly on to the next required Item in Unit I.

Communications

UNIT I: WORKING WITH WORDS

ITEM B: PLURALS

OBJECTIVES

The student must be able to:

1. Write and use singular and plural forms of words for which the plural is made by adding 's' or 'es'.
2. Write and use singular and plural forms of words, in cases where the spelling is altered before adding 's' or 'es'.
3. Write and use singular and plural forms of common words for which the plural is not formed in standard ways.

   eg: child; children ox; oxen
   mouse; mice man; men

4. Write and use words in which singular and plural forms are the same.

   eg: deer trout
   scissors sheep

5. Write and use singular and plural forms of hyphenated words.

   eg: son-in-law , sons-in-laws
   step-brother , step-brothers

Learning Resources

Basic English Review (and answer key)
English II
English III
Mastering Parts of Speech (and answer key)
Work-A-Text in English I and 2
Acetate sheets and felt pen

LEARNING ACTIVITIES

1. Read over the objectives for this item. Think of examples for each objective. Now, turn to page 31 of Basic English Review and read over the rules given there. Make brief notes on the rules and exceptions given.

2. Do the exercise (Practise 19) on page 33 of Basic English Review. Do this without looking at the rules and mark your work.

3. If you got 45 or more correct on the exercise, go on to Item Progress Check I B - Form 1. If not, reread the rules, check each of your mistakes to find out which rule you should have used and do the exercise on page 34 (Practise 20) of Basic English Review. When you have marked this exercise go on to Item Progress Check I B - Form 1.

A score the same as, or greater than, the criterion means that you can move on to the next Item. A score that is less than the criterion indicates that more work is needed.

4. This additional work must be handed in, stapled to Item Progress Check I B - Form 2. This Item Progress Check must not be done until the following is ready to hand in. First take Mastering Parts of Speech and do the exercises on page 3 and 4. When you have marked these go on to the section entitled "Plurals" on page 67-68 of English II. Check the exercise from this book with the dictionary. Following this do the section entitled "Plurals of Nouns" on page 64-67 of English III. Again, check your answers with the dictionary.

You should now be ready to write Item Progress Check I B - Form 2. Reread the objectives and, if you are certain you can do them, write the check. Do not forget to staple your previous work to the check. If you do not feel ready for this test, go to the section on "Plurals" in Work-A-Text in English I (page 20) and Work-A-Text in English 2 (page 12).

Communications Item Progress Check

UNIT I: WORKING WITH WORDS Name: _____

ITEM B: PLURALS Date: _____

Form 1

Criterion: 28/ 30

Score: ___/ 30

(20) 1. Write the plural form of each of the following words. If the word is already plural, write P in the blank.

a. tray trays
b. paint paints
c. women P
d. party parties
e. roof roofs or rooves
f. dormouse dormice
g. dish dishes
h. crowd crowds
i. Eskimo P or Eskimos
j. bush bushes
k. bus buses or busses
l. funny funnies or none
m. waif waifs
n. trout P
o. potato potatoes
p. on-looker on-lookers
q. city cities
r. cattle P
s. wife wives
t. scissors P

(10) 2. Circle the correct form of the word in brackets, to fit the context of the sentence.

a. We took four (coat, (coats), coates) to the dry cleaners.

b. Six pounds of (tomato., tomatos, (tomatoes)) are needed for that recipe.

c. My (sister-in-law, (sisters-in-law), sister-in-laws) both came to stay last week.

d. He trained his dog to help herd ((sheep), sheeps, shep).

e. The employer wanted to hire three (doorman, (doormen), doormans).

f. f. The vet came to clean the animals' (hoof, (hoofs, or hooves)).

g. He got the job of tuning all of the (pianos, pianoes, piano) in the concert hall.

h. They enjoyed watching the (monkey, monkies, monkeys) playing together.

i. There are many interesting (fact, facts, factes) to be found in an almanac.

j. There were three different kinds of (fish, or fishs, fishes) in the aquarium.

Communications Item Progress Check

UNIT I: WORKING WITH WORDS Name: _____

ITEM B: PLURALS Date: _____

Form 2

Criterion:	26 /30
Score:	___/30

(20) 1. Write the plural forms of each of the following words. If the word is already plural, write P in the blank.

a. fly flies
b. brush brushes
c. life lives
d. donkey donkeys
e. fox foxes
f. enemy enemies
g. ditch ditches
h. hero heroes
i. spoonful spoonfuls
j. belief beliefs
k. bison P
l. louse lice
m. process processes
n. fisherman fishermen
o. wolf wolves
p. cooky cookies
q. alley alleys
r. leaf leaves
s. child children
t. factory factories

(10) 2. Circle the correct form of the word in brackets, to fit the context of the sentence.

a. Help yourself; you may take as many as three (handfuls, handsful, handful).

b. This game needs two (dice, dices, die).

c. I sent my (scissor, scissors, scissores) to be sharpened

d. The (ladys', ladies, ladyes') department is near the back of the store.

e. The (cattle, cattles) were left to graze.

f. They had to raise the (ceiling, ceilings, ceilinges) in all the rooms.

g. His twin (step-brother, steps-brother, steps-brothers) were a handful to look after.

h. The dentist pulled three (teeth, toothes, tooths) at the same time.

i. The (army, armies, armys) of those (countries, country, countrys) had a brief skirmish at the border.

COMMUNICATIONS

UNIT I: WORKING WITH WORDS

ITEM C: CONTRACTIONS AND ABBREVIATIONS

OBJECTIVES

The student must be able to:

1. Identify and use contractions correctly.
2. Rewrite contractions as the two contracted words.
3. Identify and use abbreviations correctly.
4. Write the long form of common abbreviations.

LEARNING RESOURCES

Basic English Review and answer key
Basic Skills in Grammar I and answer key
English II and III
English Workshop 9 and answer key
Mastering Capitalization and Punctuation and answer key
Acetate (plastic) sheets and felt pens

LEARNING ACTIVITIES

1. You will begin this item by working on contractions. Read the notes on "Forming Contractions" on page 104 of Basic Skills in Grammar I. Study carefully the list of contractions given. In each case, find out what words the contraction was formed from. Then, do exercise D on page 105 of the same book. Check your work.

2. Read page 106 of Basic Skills in Grammar I and study the lists of abbreviations given on page 107. Do exercises A and B on page 107-108. Mark your work. If you did not make more than two mistakes in each exercise, go on to Item Progress Check I C, Form I. If you made two or more mistakes on the exercises, restudy the assignment until you

can do all the work correctly. Then go on to Item Progress Check I C, Form I.

3. If you did not make the criterion on the Item Progress Check, do the following exercises. (Make sure you do your work in your notebook; you must hand it in when you finish the Item.) For work on contractions, do the exercises on page 7-8 of Mastering Capitalization and Punctuation. For work on abbreviations, use Mastering Capitalization and Punctuation, pages 47-48. Check your work and correct any errors. See your instructor about doing Item Progress Check I C, Form 2. He may ask you to show him your completed assignment.

If you think that you need more work, before going on to the Item Progress Check, do the following exercises until you have mastered the objectives.

English Workshop 9, page 137-138
English II page 66-67
English III page 33-35

Staple all your completed assignments to the Item Progress Check I C, Form 2, when you hand it in for correcting.

Communications Item Progress Check

UNIT I: WORKING WITH WORDS Name: _____

ITEM C: CONTRACTIONS AND ABBREVIATIONS Date: _____

Form 1

Criterion:	37/ 40
Score:	) / 40

(10) 1. Write the contractions for the following:

a. it is it's
b. let us let's
c. must not mustn't
d. we will we'll
e. they had they'd
f. will not won't
g. it would 'twould
h. should not shouldn't
i. John is John's
j. who is who's

(8) 2. Write the words that these contractions are formed from:

a. you'll you will or you shall
b. can't cannot
c. he'd he had
d. they're they are
e. I'm I am
f. don't do not
g. 'twas it was
h. could've could have

(12) 3. Circle the words that can be abbreviated in the paragraph below. On the lines to the right, write the abbreviations.

On (Tuesday), (January) 5, I had to go for a job interview with the Karlson Kandy (Company). They needed a person to work in the stock (department) in their new (building). I showed them my resume, listing personal data such as address, (telephone number), (Social Insurance Number), (height) and (weight). I had also listed my previous (experience) in stock work for Harley Hawes (Limited). I got the job !

Tues. Jan.
Co. dept.
bldg. tel. no.
S.I.N. ht.
wt. exp.
Ltd. _____

and 1 mk. for having all periods in

(10) 4. Write in full the word or words that each of these abbreviations stand for.

a. incl. including ~~or~~ inclusive

b. B.C. British Columbia

c. misc. miscellaneous

d. P.S. post script

e. yr. year

f. M.L.A. Member of the Legislative Assembly

g. lb. pound

h. e.g. for example

i. ave. avenue

j. R.S.V.P. Repondez s'il vous plait ou Please answer.

Communications Item Progress Check

UNIT I: WORKING WITH WORDS Name: _____

ITEM C: CONTRACTIONS AND ABBREVIATIONS Date: _____

Form 2

Criterion:	35/40
Score:	___/40

(8) 1. In the following paragraph, circle the words that could be contracted. On the lines to the right of the paragraph write the contractions.

When (we are) on the way, (I will) tell you about our destination. (It would) ruin the surprise if I told you now. You (must not) know too much, but (I am) going to tell you that (we will) be there in about an hour, and (you will not) be sorry that (you have) come.

Note - student should see both possibilities

we're I'll
it'd or it would
mustn't we'll
you'll and won't
you've

(10) 2. In the following paragraph, circle the words that are contractions and, on the lines to the right of the paragraph, write the words from which the contractions are made.

(I'm) going out this evening, to look at John's motorcycle. (He's) been trying to sell it, and has found some people (who'll) buy it. (They're) interested in having someone else there (who's) ridden it and (isn't) trying to sell it. I (haven't) figured out why; as a friend of John's, (I'd) like to help him sell it, but (that's) alright with them. They say it (won't) matter.

I am He has
who will They are
who has is not
have not I would
that is will not

(12) 3. Write the abbreviations for the following expressions.

a. for example e.g.
b. senior sen.
c. number no.
g. feet ft.
h. Newfoundland Nfld.
i. advertisement ad.

d. miscellaneous misc. j. company co.

e. quart qt k. in care of c/o

f. afternoon p.m. l. Saturday Sat.

(10) 4. Write the complete expression for each of the following abbreviations.

a. M.P. Member of Parliament f. acct. account

b. etc. and so forth g. m.p.h. miles per hour

c. oz. ounce h. Tues. Tuesday

d. pd. paid i. in. inch

e. Alta. Alberta j. C.B.C. Canadian Broadcasting Corporation

COMMUNICATIONS

UNIT I: WORKING WITH WORDS

ITEM D: PREFIXES AND SUFFIXES

OBJECTIVES

1. Identify common prefixes and suffixes in given examples of words in which they are used.
2. State how common prefixes and suffixes alter the meaning of a word, as in these examples-

   un - usually means not -- eg. unhappy

   re - usually means did again --eg. repaid

   er - usually means more (comparing) -- eg. heavier
3. Add a correct prefix and/or suffix to a given word, for use in the context of a sentence. (Spelling must be correct.)
4. Write the root word by removing the prefix and/or suffix.
5. Identify the prefix, suffix, and root word in given examples.

LEARNING RESOURCES

Basic Reading Skills - workbook and tapes and answer key
Better and Faster Reading - textbook and answer key
English II and III
English Workshop 9 and answer key
Increase Your Vocabulary I and 2 and answer key
Acetate (plastic) sheets and felt pen

LEARNING ACTIVITIES

1. Begin work on this section by listening to the Basic Reading Skill Tapes number 12-17 and using the workbook, page 24-32. Don't do more than 2 tapes per day. Mark your work after each exercise.

2. Read page 30-35 in Increase Your Vocabulary 1, paying special attention to the lists of prefixes and suffixes and their meanings. Do the exercises on page 36 of that book and mark your work.

3. Then, go back to the Basic Reading Skills tapes and do tapes number 18 and 19, with page 33-34 as a review.

Mark your work; if you made less than 2 mistakes, you are ready for the Item Progress Check I D, Form I. Remember to check with your instructor before doing it. If you made more than two mistakes, reread and review the work you've done in this Item, before going on with the Item Progress Check.

4. If you did not make the criterion on the Item Progress Check, you will continue your work using Increase Your Vocabulary 2. Read page 18-24, paying careful attention to the lists of frequently used prefixes and suffixes on page 21-23. Then, do the exercises on page 24-25.

Mark your own work, paying apecial attention to your mistakes. You should be ready for Item Progress Check I D, Form 2, but if you are not, use some of the following exercises for more practice.

Better and Faster Reading	page 68-75
English II	page 59-63
English III	page 78-84
Increase Your Vocabulary I	page 31-36

When you are ready, see your instructor for Item Progress Check I D, Form 2. Remember to hand in the work you've done on this Item, with the Form 2 test.

Communications Item Progress Check

UNIT I: WORKING WITH WORDS Name: _____

ITEM D: PREFIXES AND SUFFIXES Date: _____

Form 1

Criterion: 23 /25
Score: ___/25

(10) 1. Write the prefix (if any), root word and suffix (if any) of each of the following words. (Use the space provided)

1 mark for each word

		Prefix	Root Word	Suffix
a.	joyous		joy	ous
b.	untanned	un	tan	ed
c.	busiest		busy	est
d.	repayment	re	pay	ment
e.	disarrange	dis	arrange	
f.	inexcuseable	in	excuse	able
g.	truthfulness		truth	ful, ness
h.	unhappily	un	happy	ly
i.	moveable		move	able
j.	unimpressed	un	impress	ed

Root words must be correctly spelled

(5) 2. Underline the prefix or suffix in each of the following words. In the space, briefly define the part of the word that you underlined.

a. happily — in a state of being 'happy'
b. misspell — wrong
c. harmless — in no way able to (harm)
d. midnight — in the middle of
e. freedom — in a state of being (free)

Teacher judgement

The root word may be used in the definition.

(10) 3. Add a prefix and/or suffix to the underlined word, so that it fits the context of the sentence. Write the new word correctly on the space to the right.

a. The boys were pleased when they had to come home from their fishing trip without any fish. displeased

b. A couger is usually noise when it stalks its prey noiseless

c. Ed's socks were matched; they were of different colours. mismatched

d. The water is shallow in the part beside the rapids. shallower or shallowest

e. You can get a ticket if you park in a legal zone. illegal

f. He wrote a note to mind him of his appointment. remind

g. They met at the appoint hour. appointed

h. That new model is quite a differ car. differ

i. It was a comfort thought to know they were safe. comfortable

j. He had look the most important point. overlooked

Communications Item Progress Check

UNIT I: WORKING WITH WORDS Name: _____

ITEM D: PREFIXES AND SUFFIXES Date: _____

Form 2

Criterion:	21/25
Score:	___/25

(10) 1. Fill in the chart with the prefixes and/or suffixes and root words of the words on the left.

		Prefix	Root Words	Suffix
a.	agreeable	_____	agree	able
b.	postdate	post	date	_____
c.	unthinkable	un	think	able
d.	reference	_____	refer	ence
e.	maladjusted	mal	adjust	ed
f.	reactionary	re	act	tion, ary
g.	misinterpret	mis	interpret	_____
h.	international	inter	nation	al
i.	beautiful	_____	beauty	ful
j.	bypassing	by	pass	ing

(5) 2. Underline the prefix or suffix of each word on the left and in the space provided, define the underlined part of the word.

a. dishonour antonym of honour ; to remove (honour)

b. purity state of being (pure)

c. happiest most (happy)

d. uncertain not (certain)

e. semicircle half (circle)

Teacher judgement
Root words may be used in defin.

(10) 3. Add a prefix or suffix to the underlined word, to fit the content of the sentence. Write the new word in the space to the right.

a. He showed his <u>wise</u> by giving a thoughtful answer. wisdom

b. The train stood <u>mobile</u> while the track was repaired. immobile

c. John walked through the door, into the <u>joining</u> room. adjoining

d. He made a <u>revise</u> of his essay after proofreading it. revision

e. He sent for a <u>subscribe</u> to that magazine. subscription

f. Be careful to write <u>legible</u>. legibly

g. We had a quarrel, which made the whole evening very <u>pleasant</u>. unpleasant

h. I've always been the <u>short</u> person in the class. shortest

i. They began work on <u>construction</u> of the buildings that were ruined by the fire. reconstruction

j. You should be careful not to <u>spell</u> words when you write. misspell

Spelling must be correct.

COMMUNICATIONS

UNIT I: WORKING WITH WORDS

ITEM E: SYNONYMS, ANTONYMS, HOMONYMS

OBJECTIVES

The student must be able to:

1. Define synonyms, antonyms and homonyms.
2. Write and use synonyms for given words, including examples of writing a synonym to fit the context of a sentence.
3. Write and use antonyms for given words, including writing antonyms to fit the context of a sentence.
4. Select and use proper homonyms according to sentence context.
5. Proofread and correct errors in homonym usage in a given sentence or paragraph.

LEARNING RESOURCES

Basic English Review and answer key
Basic Reading Skills workbook and answer key
English II and III
English Workshop 9 and answer key
Mastering Good Usage and answer key
Increase Your Vocabulary I and 2 and answer key
Acetate sheets and felt pens

LEARNING ACTIVITIES

1. Start your work for this Item on page 24 of Increase Your Vocabulary I. Read the notes on page 24-26 until you are sure of the definitions of synonyms, antonyms and homonyms. Think of examples (other than those given) of each type of word pair. Then, do the exercises on pages 27-29 of Increase Your Vocabulary I. Do also the exercises on page 22-23 of that book. Mark your work. If you scored 2 or less mistakes on each exercise, you are ready for the Item Progress Check. If not, review this section and study the word lists on page 14-21. Review the exercises, redoing them if necessary. Now, go on to Item Progress Check I E, Form 1.

If you did not make the criterion on the test, you need more work. Examine your mistakes. If for example, you got all questions on synonyms correct, you need not do the synonym work, but if you made any errors on that section, do the work outlined. Your instructor may help you assess your difficulties.

2. For work on synonyms, read page 34-35 of Increase Your Vocabulary 2. Study the synonym lists on page 35 and 37. Then, do the exercises on page 36 and 38. Mark your own work. If you need further review, do the appropriate pages listed for supplementary work.

3. For a review of antonyms, use Increase Your Vocabulary 2, read page 32 and do the exercises on page 33. Mark your work. If you are still confused about antonyms, do the appropriate pages listed as supplementary work.

4. For more work on homonyms, begin on page 26 of Increase Your Vocabulary 2. Read page 26-32, doing the exercises given. Study the list of homonyms on page 27-31 and copy the pairs that you are not familiar with as well as those you make mistakes with. Use each problem word in a sentence. If you need more review, do the appropriate supplementary work.

5. You should now be ready for Item Progress Check I E, Form 2. If so, see your instructor to do it. If not, do exercises from the following list, until you feel you have mastered the objectives.

Basic English Review	page 197-200 (some homonyms)
Basic Reading Skills	page 99-100 (antonyms & synonyms)
English II	page 55-58 (synonyms, antonyms, homonyms)
English III	page 88-91 (synonyms, antonyms, homonyms)
English Workshop 9	page 61-62 (synonyms)
Mastering Good Usage	page 35-37, (homonyms) 40-43

Do all your work in your notebook and attach it to the Item Progress Check I E, Form 2, which you are now ready to do.

Communications Item Progress Check

UNIT I: WORKING WITH WORDS Name: _____

ITEM E: SYNONYMS, ANTONYMS AND HOMONYMS Date: _____

Form 1

Criterion:	23 / 25
Score:	___ / 25

Teacher judgement required where answers differ

(8) 1. Write a synonym and an antonym (in the spaces provided) for the word on the left.

		Synonym	Antonym
a.	finish	end	start
b.	unhappy	sad	cheerful
c.	under	beneath	over
d.	terrible	dreadful	wonderful
e.	work	labour	rest
f.	quickly	rapid, fast	slowly
g.	courage	bravery	fear
h.	falling	dropping or descending	rising

(4) 2. Write a synonym for the underlined words, to fit the content of the sentence. Put the word in the space to the right.

a. The police are very severe with drivers who speed. stern, harsh

b. The work crew spent ten hours a day to get the house built by winter. constructed

c. Frequent brushing will make your hair shiny. glossy

d. Don't hesitate, you'll take longer to get the work done. pause or falter

(4) 3. Write an antonym for the underlined word, to fit the content of the sentence. Put the word in the space to the right.

a. That essay should be <u>lengthened</u>. shortened

b. He's a very <u>clever</u> student. dull

c.w I've never met such a <u>friendly</u> person. unfriendly

d. Is that bridge <u>safe</u> to walk on. dangerous

(1) 4. What is a homonym? a word that sounds the same as another word but is spelled differently and has a different meaning.

(8) 5. In the following sentences, circle the errors in homonym usage. Use the spaces provided to write the correct homonyms, in order.

a. The (some) total of (there) work was done before you arrived. sum their

b. (Wood) you ever pay him a (complement)? Would compliment

c. He had to alter the (breaks) on the car. brakes

d. This is an interesting (coarse); I've been (taut) a lot of things. course taught

e. When were those books banned?

1 mk. for no changes in (e) and 1 mk. per word correct.

Communications Item Progress Check

UNIT I: WORKING WITH WORDS Name: _____

ITEM E: SYNONYMS, ANTONYMS, HOMONYMS Date: _____

Form 2

Criterion:	21 / 25
Score:	___ / 25

(1) 1. What is a synonym? has similar meaning to another word

(1) 2. What is an antonym? has a meaning opposite to that of another word

(8) 3. Write a synonym and an antonym for each of the following words.

		Synonym	Antonym
a.	cheerful	happy	sad
b.	blunt	dull	sharp
c.	healthy	hale	ill
d.	fearless	bold	afraid
e.	vacant	empty	full, inhabited
f.	destroy	ruin	create
g.	hesitate	pause	proceed
h.	polite	courteous	rude

(10) 4. Circle the correct homonym from those given in brackets, to fit the content of the sentence.

a. The school (principal, principle) called a staff meeting.

b. The (personal, personnel) officer is the man who does the hiring for our firm.

c. (There, Their) is a special meeting of the town (counsel, council) tonight.

d. They were trying (to, too, two) decide if they should let (miners, minors) vote.

e. Alderman Taylor set (forth, fourth) a notion to allow the young people to vote.

f. He also (lead, led) discussion of the problem.

g. They decided to (wait, weight) and run a survey to determine (whether, weather) there was enough interest in voting.

(5) 5. Write a homonym for each of the words given, and use the homonym (you wrote) in a sentence.

Definitions below

a. course coarse

b. sight cite or site

c. steal steel

d. wear where

e. horse hoarse

a. coarse - rough, crude

b. cite - give as an example, site - place

c. steel - a metal

d. where - at what place

e. hoarse - having a rough voice

Communications Unit Progress Test

UNIT I: WORKING WITH WORDS

Name: _____

Form 1

Date: _____

Criterion:	64 / 70
Score:	___ / 70

Section A - Item A must be completed before writing this test.

Section B - Write the plural of each of the following words. If the word is already plural, write P in the blank.
(15)

1. creature creatures
2. igloo igloos
3. assembly assemblies
4. beach beaches
5. cupful cupfuls
6. business businesses
7. measles P
8. safe safes
9. inquiry inquiries
10. hero heroes
11. deer P
12. knife knives
13. topaz topazes
14. mother-in-law mothers-in-law
15. plural plurals

Section C - Write a contraction for each of the following
(24)

1. I will I'll
2. she is she's
3. he had he'd
4. could not couldn't
5. it is it's
6. will not won't

Write the words that these are contractions for.

7. can't cannot
8. shan't shall not
9. we're we are
10. they'd they had
11. 'twas it was
12. don't do not

Write abbreviations for these expressions.

13. cash on delivery c.o.d.
14. paid pd.
15. Thursday Thur.
16. May is not abbreviated
17. foot ft.
18. inclusive incl.

Write the expressions that these abbreviations represent.

19. Fri. Friday
20. M.P. Member of Parliament
21. Dr. Doctor
22. vol. volume
23. Nov. November
24. eg. for example

Section D. (14) Fill out the chart below with the prefixes, suffixes and root word, from each word on the left.

	Prefix	Root Word	Suffix
1. troublesome		trouble	some
2. decision		decide	ion
3. rematch	re	match	
4. unsatisfactory	un	satisfy	actory
5. transplant	trans	plant	
6. suburban	sub	urban	
7. deformed	de	form	ed
8. remittance		remit	ance
9. reaction	re	act	tion

Spelling of root words must be correct

Underline the prefix or suffix in each of the following words and in the space provided, briefly define the underlined part.

10. hopeless without (hope) Teacher Judgement
11. disappear not (appear) Root words may be used in definition
12. reality state of being (real)
13. midnight in the middle of
14. impractical not

Section E

(1) 1. What is a synonym? word with similar meaning to another word

(1) 2. What is an antonym? opposite.

(1) 3. What is a homonym? a word that sounds the same but has different spelling and meaning

(6) Write a synonym and an antonym for each word on the left.

		Synonym	Antonym
4.	timid	afraid	bold
5.	tidy	neat	messy
6.	monotonous	dull, mundane	varied
7.	satisfy	fulfil, content	dissatisfy
8.	average	normal	unusual
9.	important	vital	unnecessary

(8) Write a homonym for each word below, then use both words correctly in sentences.

Definitions given

10. wears wares

wears- has on

wares- product for sale

11. aloud allowed

aloud- voiced audibly

allowed- permitted

12. capital capitol

capital- chief town, excellent

capitol- specific building

13. horse hoarse

horse- an animal

hoarse- in a rough voice

Communications Unit Progress Test

UNIT I: WORKING WITH WORDS

Name: _____

Form 2

Date: _____

Criterion:	60/70
Score:	/70

Section A Item A must be completed before writing this test.

(15) Section B Write the plurals of each of the following words. If the word is already plural, write P in the blank.

1. ox oxen
2. echo echoes
3. scarf scarves
4. shelf shelves
5. birdhouse bird houses
6. community communities
7. donkey donkey
8. saleswoman sales women
9. fox foxes
10. employee employees
11. moose P
12. cameo cameos
13. glass glasses
14. history histories
15. news P

(24) Section C Write the contractions for each of the following.

1. shall not shan't
2. he is he's
3. cannot can't
4. you should not contracted
5. I did not I didn't
6. It has not It hasn't

Write the words from which these contractions are formed.

7. I'm I am
8. won't will not
9. we'll we will
10. you'd you had
11. doesn't does not
12. isn't is not

Write abbreviations for the following: Periods must be included

13. amount amt.
14. Reverend Rev.
15. Canada Can.
16. Mister Mr.
17. October Oct.
18. street st.

Write the expressions that these abbreviations represent.

19. ave. avenue
20. Dec. December
21. Sept. September
22. Nfld. Newfoundland
23. etc. and so forth
24. pvt. private

(14) Section D Fill out the following chart, with the prefixes, root words and suffixes from the words on the left.

	Prefix	Root Word	Suffix
1. disobedient	dis	obey	(d)ient
2. unlocked	un	lock	ed
3. mismatch	mis	match	
4. comedian		comedy	ian
5. unpitying	un	pity	ing
6. wisdom		wise	dom
7. mistreat	mis	treat	
8. unaware	un	aware	
9. examination		examine	tion

Spelling of root words must be correct

Underline the prefix or suffix in each of the following words. On the space provided, briefly define the underlined part.

10. indirect not (direct) — Teacher Judgement
11. honorable having (honor) — Answers may include root words
12. happiest most (happy)
13. dishonour remove (honour)
14. lawful within (law

(7) Section E Write a synonym and an antonym for each of the following words:

		Synonym	Antonym
1.	friendly	sociable	unfriendly
2.	clear	plain	confusing
3.	uncommon	rare	usual
4.	excite	arouse	deflate
5.	strong	virile	weak
6.	break	destroy	mend
7.	start	begin	stop

(10) Write a homonym for each word given and use both words in sentences. Underline the word in the sentence you write.

Definitions given Teacher judgement of sentences

8. there: their

there - away from here

their - belonging to them

9. weather: meteorological conditions

whether in case

10. feet: measure of distance
or those things attached to the lower extremities

feat - accomplishment

11. council: an advisory or governing group

counsel advice or to advise

12. right: correct

rite - ceremony

UNIT III: Health

ITEM A: Foods and Nutrition

OBJECTIVES

The student must be able to:

1. State the reasons for the importance of a good diet.
2. Identify the role in good nutrition of-

   carbohydrates
   proteins
   minerals
   vitamins
   fats

3. Prepare a nutritionally balanced food list.
4. Locate and use sources of consumer information.

LEARNING RESOURCES

Booklets: Healthful Eating, Canada Dep't of Health and Welfare

The Supermarket Storybook, Rush

Book: Science, Pomeroy

Local Resources: Public Health centre in your community
Home Economics Division of B.C. Hydro
Canada Department of Health and Welfare
Newspaper

LEARNING ACTIVITIES

Read pages 5 to 13 in the booklet, Healthful Eating. Note especially "Canada's Food Guide" on page 5. On the pages following you will find accurate descriptions of everyday terms used to describe the food we eat, such as "condensed milk" and "enriched bread", and so on.

(1) What is "Canada's Food Guide"? Copy it into your notebook.

Read pages 14 to 24 on "Food for the Family" and "Menu Planning". Note how different members of a family should have different diets to meet their special needs.

(2) Make brief notes under the headings of Special Diet Requirements:

The Infant
The Pre-schooler
The School Child
The Teen-ager
The Adult
The Older Person

Food Budgeting: Read carefully pages 25 to 29 in Healthful Eating. Here are many suggestions regarding planning a diet and buying food supplies. Note the charts carefully.

(3) Plan a diet for a family of four for one week (2 parents, 1 teenager, 1 school child). Be sure the necessary nutrients are present, and try to keep costs lower by using good substitutes. Your completed list should look something like the chart on page 22. When you have outlined the diet, make a "shopping list" of the total amounts of food required for that menu for a week.

Find the booklet Supermarket Storybook, and read from the beginning to page 12. You will no doubt find out some interesting information. From page 12 on, the authors of the booklet mix fact and opinion, and present a rather one-sided view.

When you have completed all the prescribed reading and assignments, meet together with your instructor and the members of your group to check menus and compare shopping lists and discuss any difficulties. Select the best shopping list from all those in the group and use it for the "consumer research project", which you shall now do...

(4) Group members should divide into pairs and take the shopping list to a nearby supermarket or grocery store. Find the price of each item, and the total cost of the food on the list. Different

pairs should "shop" in different stores. Keep an accurate record and report back to the group at a time arranged with the instructor. Compare the costs. Who got the best value for the money? Do prices on the same items vary from one store to another? Where seems to be the best place to shop? Try to determine if prices vary during the week, and find out if there is a best time to shop! (In the Spring of 1973, in Burnaby, science groups found their cost to be a little under $50.00.)

If you require any further information on nutrition and economical buying, you should contact one of the local resources listed in the Learning Resources for this Item. *

Now review your objectives for this Item. Can you do what they require of you? If not, perhaps a reading in Science will help you. Read pages 295 to 304, and try the review questions which follow. In addition, you can test your "Food Dollar I.Q." by doing the little contest below. Compare your marks with that of others in your group.

When you are sure that you have met the objectives for this Item, go on to Item B of this Unit.

* In addition, there is a free and confidential service offered by the B.C. Dietetic Association. It is called "Dial-a-Dietitian". If a person has any question about foods, including preparation, storing, labelling, additives, and so on, he or she may phone in the question between 10 A.M. and 12 Noon on weekdays. An answer will be given within 48 hours. The phone number is 687-6439.

What's Your Food Dollar I.Q.?

Answer "yes" or "no" to the following questions:

1. Do you know about (within two or three dollars) what your family spends on food per week?

2. Do you know what foods are needed for health according to Canada's Food Guide?

3. Do you plan meals on paper before shopping?

4. Do you use a shopping list for buying foods?

5. Do you follow your shopping list in the store (no impulse buying)?

6. Do you read labels for information on quantity and grade of content?

7. Do you plan to shop only once or twice a week?

8. Do you keep up-to-date with new foods and compare them with those you usually use before buying them?

9. Do you know the meaning of the different inspection stamps and brand or grade labels attached to food products?

10. Do you compare the cost, flavor and appearance of foods in different forms - fresh, frozen, canned, dried?

11. Do you follow newspaper reports to know the best time to buy certain foods?

12. Do you know how to prepare the less expensive cuts of meat such as stewing beef to preserve flavor and food value yet develop tenderness?

13. Do you buy meats on the basis of cost per serving rather than cost per pound?

14. Do you follow recipes or label directions carefully when you prepare foods?

15. Do you buy economy sizes when they offer savings, providing you can use the larger amount and have the storage space required?

16. Do you compare prices and quality in different stores?

17. Do you very seldom have food left-over after a meal?

18. Do you compare cost of a convenience food with its home-made counterpart before buying the convenience food?

19. Does your menu plan include the packed lunches and lunches eaten at home as well as supper meals?

20. Do Fancy, Choice and Standard grades of canned products such as peas, peaches, all have the same food value?

21. Do you buy vitamin or mineral supplements only when prescribed by your doctor?

22. Do you use extenders such as rice, macaroni and skim milk powder when cooking group meat dishes?

23. Do you check weekly specials as advertised in newspapers before making your menu.

24. Do you choose cereals for food value rather than for their premium, sweet coatings, advertising or fancy packages?

25. Do you buy meats such as bologna in the piece and slice it at home?

Give yourself four points for each "yes" answer. If your total score is: 80 to 100 - You are an intelligent food buyer

60 to 80 - You can improve

Below 60 - You need to develop buying skills

UNIT III: Health

ITEM B : Disease Prevention

OBJECTIVES

The student must be able to:

1. Identify the most common causes of infectious diseases.
2. Identify some causes of non-infectious diseases.
3. Describe the nature of antibodies and immunity in the body's defence against diseases.
4. Outline the services of the health and care agencies which are available at both the community and provincial level in B.C.

LEARNING RESOURCES

Book: Science, Pomeroy

Local Resources: Local Public Health Office.

LEARNING ACTIVITIES

This Item on disease prevention and treatment should give you some knowledge of how diseases spread and how they can be prevented. More important, perhaps, is that you will also become more aware of the various health services available to you and your family.

(1) Read Science, chapter 28, on pages 306 to 314. When you have done this, copy and complete the review questions on page 315.

Included in this Item are notes taken from a B.C. Hospital Insurance

Services pamphlet. These outline the type of medical care that the citizens of B.C. provide for themselves through the government and the BCHIS. Read these through carefully, and note the wide variety of services which are available to you.

HOSPITAL INSURANCE

The main functions of the British Columbia Hospital Insurance Service (B.C.H.I.S.) since its start on January 1, 1949, have been to protect the residents of the Province from the financial burden of a stay in hospital, to enable hospitals to improve their services by providing them with a steady income, to assist communities in building adequate hospital facilities, and to help hospitals establish and maintain high standards of patient care.

During the 19 years of hospital insurance coverage in British Columbia, daily payments to British Columbia hospitals have increased from $50,000 to over $300,000. More than 8,500 beds have been built, as well as new service areas, such as radiological and laboratory departments, at a total cost in excess of $113,000,000. Provincial Government grants toward these costs exceeded $53,000,000.

Benefits

Residents are provided with the following in-patient benefits, for which the patient pays $1 per day; Standard-ward accommodation, meals, nursing services, and all other available hospital services, such as laboratory and X-ray services, operating-room and case-room facilities, drugs and biologicals, etc. For patients not requiring admission to hospital, B.C.H.I.S. provides emergency services and out-patient surgery benefits at a charge of $2 for each visit.

Activation and Rehabilitation Care

Since September 1, 1960, B.C.H.I.S. coverage has been given to those in-patients of approved hospitals who, in the opinion of medical authorities, will benefit from activation and rehabilitation treatment services. As a result of this programme, many patients have been able to return to their own homes who may have required an indefinite stay in hospital.

Extended Hospital Care

On December 1, 1965, extended hospital care coverage was provided to patients in approved facilities operated by public hospitals, or other non-profit agencies, who do not need acute hospital care but who require skilled nursing care and continuing medical supervision over a lengthly period of time.

Regional Hospital Districts

British Columbia has been divided into large districts to enable regional planning, development, and financing of hospital projects to be carried out

under a revised formula, which increases the Provincial Government grant toward the cost of hospital construction. The board of the regional hospital district will be responsible for co-ordinating the requests for funds from hospitals within the district, and for presenting money by-laws to the taxpayers in respect of either single projects or an over-all programme of hospital projects for the district.

Services Provided to Hospitals

In addition to the payment of hospital accounts and the provision of grants-in-aid toward capital cost, the Hospital Insurance Service also provides specialized services to hospitals and communities. Professional staff consultants assist hospitals with administrative and operational problems, planning and developing construction programmes, site selection, accounting problems, by-law amendments, bed requirement studies, development of disaster plans, assessment of specialized medical equipment needs, development of a medical record system, and work methods studies.

The next part of your assignment for this Item requires you to try your skill at locating and using information. Specifically, you are to go with your group to the nearest Public Health office to examine the nature and variety of services offered by this agency.

(2) Make a list of the services offered by your local Public Health Office, and beside each item listed, write a sentence or two explaining it in more detail.

Your list will probably include over a dozen services, ranging from Public Health Inspection to Expectant Parent classes. There will be pamphlets available which will probably give you most of the information you need.

As you list these services, select one which interests you more than the others. Find out all you can about it. If, for example, you are interested in "Dental Health Services", find pamphlets which tell you about it. Ask the receptionist or nurse some specific questions regarding this service. Where and when is it available? Who is it for? Are there any costs involved? And so on--get all the information you can, and make notes as you get it. Plan your questions carefully before you ask them. You are in fact, interviewing this person for the purpose of getting information. This skill in interviewing is also very necessary when job hunting, so it is a useful one to practice!

(3) Writing Assignment: Write a report over half a page in length, on the specific health service which interests you.

Plan your work carefully before you begin writing. Each person in the group must write on a different topic. (there are lots to choose from.☺) When you have finished your report READ IT ALOUD to the others in your group. This will (a) enable you to hear and correct any mistakes in English, and
(b) enable your group to learn something more about the service which you wrote about.

When all the reports have been completed and read aloud, review the objectives of both Items in the Unit. Then write the Unit III Science Test. Hand in your writing assignment with your completed test.

Science Test

UNIT III

NAME:_____

DATE:_____

Test Score	___ out of 35
Paragraph	___ out of 10
Total Score	___ /45

Exercise 1: Multiple choice. For each question, choose the best answer or phrase from the four choices listed. Circle the letter corresponding to your choice.
(35)

1. Digestion begins in the...

   a) mouth
   b) throat
   c) intestine
   d) stomach

2. Chewing food in the mouth breaks the food into small pieces producing a...

   a) chemical change in the food
   b) physical change in the food
   c) mechanical change in the food
   d) both (a) and (b)

3. Foods containing carbohydrates such as starch and sugar supply the body with...

   a) building materials
   b) repair materials
   c) energy materials
   d) regulating materials

4. When the body is exposed to sunlight, it produces vitamin...

   a) A
   b) B
   c) C
   d) D

5. Lack of vitamin A...

   a) reduces the body's resistance to colds
   b) produces rough, scaly skin
   c) causes night blindness
   d) all of the above

6. Vitamin A is found in...

a) butter
b) green leafy vegetables
c) fruit
(d) both (a) and (b)

7. Diseases which are genetic in origin are caused by...

a) antibodies
b) viruses or bacteria
(c) abnormal chromosomes
d) parasites

8. For normal growth the body needs...

a) vitamins
b) minerals
c) carbohydrates
(d) all of the above

9. Building bones and teeth, clotting of blood, and the regulation of heart and muscles requires calcium which is a...

a) carbohydrate
b) protein
(c) mineral
d) vitamin

10. Natural immunity...

(a) is an inborn defence against diseases
b) requires the presence of antibodies
c) can be acquired by vaccination
d) is all of the above

11. Goiter is prevented by an adequate body supply of the mineral...

a) calcium
b) iron
c) phosphorous
(d) iodine

12. The mineral used in the formation of haemoglobin is...

a) calcium
(b) iron
c) phosphorous
d) iodine

13. Vitamin B complex is found in...

a) meat and eggs
b) peas, beans, and green leafy vegetables
c) cereals and milk
(d) all of the above foods

14. One of the best food sources of calcium is...

a) bread
b) milk
c) cereal
d) cake

15. Acquired immunity...

a) is an inborn defence against diseases
b) requires the presence of antibodies
c) cannot be acquired by vaccination
d) includes all of the above

16. A good food source of the mineral iodine is...

a) bread
b) milk
c) cake
d) seafood

17. Infectious diseases can be caused by...

a) the presence of antibodies
b) bacteria and viruses
c) abnormal chromosomes
d) all of the above

18. Penecillin is...

a) an antibiotic
b) a disinfectant
c) a tranquilizer
d) a vaccine

19. Iron is found in foods such as...

a) apples
b) liver
c) milk
d) none of the foods listed

20. Foods containing fats are...

a) butter, lard, and oleomargine
b) peanut oil, corn oil, and olive oil
c) meat, fish, poultry
d) all of the above

21. Fats supply the body with...

a) minerals and vitamins
b) energy and heat
c) building and repair materials
d) body regulation materials

22. Each day's meals should include...

a) foods from each group in Canada's Food Guide
b) one carbohydrate and one protein food
c) a piece of fruit
d) a serving of meat

23. Carbohydrates furnish t[illegible]y with...

a) heat and energy
b) building and repair materials
c) regulating materials
d) materials for normal growth

24. Food sources of carbohydrates are...

a) cereals and bread
b) vegetables
c) cake and candy
d) all of the above foods

25. A dinner based on Canada's Food Guide would include...

a) hot dogs and soft drinks
b) liver, baked potato, baked beans, bread and beverage
c) macaroni and cheese, bread and beverage
d) meat, potatoes, vegetable, salad, fruit, cookies and beverage

26. Proteins supply the body with..

a) heat and energy
b) building and repair materials
c) regulating materials
d) materials for normal growth

27. Food sources of protein are...

a) meat and eggs
b) milk and cheese
c) fish and beans
d) all of the above

28. A midnight snack based on Canada's Food Guide would include...

a) chips and coke
b) an apple or an orange
c) a glass of skim milk
d) either b or c

29. Water is required for...

a) the secretion of glands
b) the excretion of wastes
c) the digestion of food
(d) all of the above

30. Energy in food is measured in...

a) units
b) pounds
c) degrees
(d) calories

31. An example of a chronic disease is...

a) mumps
b) malaria
(c) asthma
d) trichinosis

32. The main function(s) of the B.C. Hospital Insurance Service is/are to...

a) protect B.C. residents from high hospitalization costs
b) assist communities in providing good hospital care
c) enable hospitals to improve their services
(d) all of the above.

33. If you require immunization you should contact your local...

a) hospital
(b) Public Health Nurse
c) doctor
d) Mental Health Unit

34. An example of a communicable disease is...

(a) mumps
b) cancer
c) heart disease
d) ulcers

35. If the community pool in which your children swim seems to be dirty and neglected, you should contact...

a) the Public Health Nurse
b) the police
(c) the Public Health Inspector
d) the Medical Health Officer

APPENDIX IV

STUDENT OPINION SURVEY

Phase I 1973

Pupil Oustionnaire for VAST Program

Circled numbers are ratings by VAST students

Please express your real opinions about the classes you have had up to this date. Do not put your name on this paper. No-one will know which responses are yours.

Date_____ Male or Female_____

Consider each item carefully, then circle the number that best represents your feeling about this class.

1. The instructor established good rapport with students in the class.

1 2 3 4 5 6 7 (8.1) 9 NA

Disagree very strongly — Disagree — Agree — Agree very strongly

2. The Science Program is quite well organized and well laid out.

1 2 3 4 5 6 (7.1) 8 9 NA

Disagree very strongly — Disagree — Agree — Agree very strongly

3. The learning materials in the Science program helped me to learn the material presented with the objectives.

1 2 3 4 5 6 7 (7.7) 8 9 NA

Disagree very strongly — Disagree — Agree — Agree very strongly

4. The people I worked with in Science helped me to learn my objectives.

1 2 3 4 5 6 7 (7.3) 8 9 NA

Disagree very strongly — Disagree — Agree — Agree very strongly

5. I can honestly say that I helped my fellow Science group members to learn.

1 2 3 4 5 6 (6.7) 7 8 9 NA

Disagree very strongly — Disagree — Agree — Agree very strongly

6. I think that the time spent in Oral Communication is worth while.

1 2 3 4 5 6 7 (7.5) 8 9 NA

Disagree very strongly — Disagree — Agree — Agree very strongly

7. Oral Communication has helped me to work with others.

1 2 3 4 5 6 7 (7.8) 8 9 NA

Disagree very strongly — Disagree — Agree — Agree very strongly

8. As a result of Oral Communications, I find that it is easier for me to express my views to others.

1	2	3	4	5	6	7	(7.6) 8	9	NA
Disagree very strongly			Disagree			Agree		Agree very strongly	

9. The Writing Program is well laid out and organized.

1	2	3	4	5	6	(6.7) 7	8	9	NA
Disagree very strongly			Disagree			Agree		Agree very strongly	

10. The Writing Program has been a [illegible] help in improving my writing.

1	2	3	4	5	6	7 (7.2)	8	9	NA
Disagree very strongly			Disagree			Agree		Agree very strongly	

11. The learning materials (books, pamphlettes, tapes) have helped me to master the objectives of the writing program.

1	2	3	4	5	6 (6.4)	7	8	9	NA
Never		Seldom		Sometimes		Often		Always	

12. The S.R.A. kits seem to have helped me to increase my reading speed.

1	2	3	4	5	6	7 (7.5)	8	9	NA
Disagree very strongly			Disagree			Agree		Agree very strongly	

13. The Reading Program has made me a better reader.

1	2	3	4	5	6	7 (7.7)	8	9	NA
Disagree very strongly			Disagree			Agree		Agree very strongly	

14. The Math Program is well organized.

1	2	3	4	5	6	7 (7.7)	8	9	NA
Never		Seldom		Sometimes		Often		Always	

15. The materials for the Math course helped me to learn the objectives.

1	2	3	4	5	6	7 (7.3)	8	9	NA
Never		Seldom		Sometimes		Often		Always.	

16. I think it is a good idea to pre-test all of the units in Math with a Diagnosis.

1	2	3	4	5	6	7	8 (8.5)	9	NA
Disagree very strongly			Disagree			Agree		Agree very strongly	

17. My planning sheet has been of great asset to me in planning my work.

1	2	3	4	5	6	7	(7.2)	8	9	NA
Very poor		Poor		Average		Good			Very good	

18. I feel that the fact that I was allowed to learn at my own rate helped me to learn more.

1	2	3	4	5	6	7	8	(8.1)	9	NA
Disagree very strongly			Disagree			Agree			Agree very strongly	

19 This course has helped me toward my ultimate goal.

1	2	3	4	5	6	7	(8.0)	9	NA
Disagree very strongly			Disagree			Agree		Agree very strongly	

20. If I was really honest with myself I would have to say that I would rather the instructor's put pressure on me to work harder.

1	2	3	4	(5.1)	6	7	8	9	NA
Disagree very strongly			Disagree			Agree		Agree very strongly	

COMMENTS:

" I find it frustrating to learn things on the surface and then go on to the next item when I would be interested in delving deeper into the subject, eg. in science mainly. I realize that this is because the learning material is condensed to learn it in a shorter period of time than in high school. It is good, though, in that it arouses my interest to find out further information. ---------- ---------- I really approve of the method of working at ones own speed!"

"In my opinion I found this course very worthwhile and interesting. It has helped me to learn to communicate with others, learn to get along with others, and has been an all round good help. I have always wanted to completed school, but could never go back to High School. I enjoyed myself and couldn't have done it without the help from Cilla, Derek, and the rest of my class members, to them I owe my thanks."

" You can only help those who want to help themselves. Good work group."

APPENDIX V

LEARNING RESOURCES SURVEY

Phase I 1973

Finishing up your BTSD level 3 course? Before you go we would like to have your thoughts on a few things. First of all, we would like to know what you think about the learning materials. It would be appreciated if you would evaluate each learning resource by circling the appropriate evaluation. The range is from 1 (of no use at all in learning) to 5 (very valuable for learning). Your cooperation will be appreciated by future students as well, since you will help us to select the best materials for learning.

Communication

1. Basic English Review
   1 2 3 4 5

2. Basic Skills in Grammar, Book I and II
   1 2 3 4 5

3. Increase your Vocabulary, Book I and II
   1 2 3 4 5

4. Better and Faster Reading
   1 2 3 4 5

5. Work-A-Text, English I and II
   1 2 3 4 5

6. English II and III
   1 2 3 4 5

7. Vocational English 1, 2 and 3
   1 2 3 4 5

8. English on the Job A and B
   1 2 3 4 5

9. Mastering: Punctuation, Parts of Speech, Good Usage, the Sentence.
   1 2 3 4 5

10. Basic Reading Skills
    1 2 3 4 5

Mathematics

1. Refresher Mathematics
   1 2 3 4 5

2. Learning to Compute
   1 2 3 4 5

3. Basic Mathematics
   1 2 3 4 5

4. B Math (Pitman)
1 2 3 4 5

5. General Mathematics
1 2 3 4 5

6. Fractions I and II, Decimals and Percentage I and II
1 2 3 4 5

7. Programmed Math for Adults, Books 1 to 15
1 2 3 4 5

8. S.R.A. Computational Skills Development Kit
1 2 3 4 5

9. Drill Tapes (Problem solving)
1 2 3 4 5

10. Math Mastery Tapes
1 2 3 4 5

Science

1.Cassette Filmstrips
1 2 3 4 5

2. Motion Pictures
1 2 3 4 5

3. Silent Filmstrips
1 2 3 4 5

4. Van Nostrand texts (Science, A Way of Knowing, The Cell,Basis of Life, etc.)
1 2 3 4 5

5. Cambridge Work-A-Text (Life Science, Practical Modern Physics)
1 2 3 4 5

6. Physical Science, A Modern Approach
1 2 3 4 5

7. Science, by Pomeroy
1 2 3 4 5

8. The Materials of Life, Pathways in Science.
1 2 3 4 5

9. Science Experiment Kits
1 2 3 4 5

Comments:

APPENDIX VI

LIST OF REQUIRED COMMERCIAL LEARNING RESOURCES

Revised May 1974

COMMUNICATIONS	NO. REQ'D	NET PRICE EA.
Basic Reading Skills - workbook	3	$ 1.68
Basic Reading Skills - Teacher's Edition	3	$ 1.68
Basic Reading Skills - cassette tapes set A Artley, Monroe, and Robinson Scott, Foresman and Co. Supplier: Gage and Co.	1	$61.56
Basic English Review	6	$ 2.00
Manual for above N. Scachter South - Western Publishing Supplier: Gage and Co.	3	$ 1.88
Basic Skills in Grammar, Book 1	3	$ 1.04
Answer Key for above	3	$ 0.28
Basic Skills in Grammar, Book 2	3	$ 1.04
Answer Key for above Cambridge Book Co. Supplier: Gage and Co.	3	$ 0.28
Increase Your Vocabulary, Book 1	3	$ 1.04
Answer Key for above	3	$ 0.28
Increase Your Vocabulary, Book 2	3	$ 1.04
Answer Key for above P. Mathis Cambridge Book Co. Supplier: Gage and Co.	3	$ 0.28
Better and Faster Reading	3	$ 2.00
Answer Key for above Lee Learner Gray Cambridge Book Co. Supplier: Gage and Co.	3	$ 0.28
Work - a - Text in English, Book 1	3	$ 1.80
Answer Key for above	3	$ 0.28
Work - a - Text in English, Book 2	3	$ 1.80
Answer Key for above L.Gray and T. Hauser Cambridge Book Co., Supplier: Gage and Co.	3	$ 0.28

COMMUNICATIONS	NO. REQ'D	NET PRICE EA.
Dictionary of Canadian English The Senior Dictionary Supplier: Gage and Co.	6	$ 6.90
Applied Penmanship	1	$ 1.64
Manual for above L.H. Lyon South-Western Publishing Supplier: Gage and Co.	1	$ 0.56
The above are available from Gage Educational Publishing P.O. Box 5000, 164 Commander Boulevard, Agincourt, Ontario M1S 3C7		
Business English Essentials - 4th ed. Henderson and Voiles Supplier: Gregg Division McGraw-Hill 330 Progress Ave. Scarborough, Ont.	1	$ 5.75
Mastering Capitalization and Punctuation	3	$ 0.30
Answer Key for above	3	$ 0.35
Mastering Good Usage	3	$ 0.30
Answer Key for above	3	$ 0.35
Mastering Parts of Speech	3	$ 0.30
Answer Key for above	3	$ 0.35
Mastering The Sentence	3	$ 0.30
Answer Key for above Parks, Raffensberger and Black Supplier: Continental Press Inc. 407 S.W. 11th Avenue, Portland, Oregon 97205	3	$ 0.35
English II Weinhold Supplier: Holt, Rinehart and Winston	3	$ 1.76
English III Wachner Supplier: Holt, Rinehart and Winston	3	$ 1.55

COMMUNICATIONS	NO. REQ'D	NET PRICE EA.
A Self-Improvement Guide to Spelling Johnson Supplier: Holt, Rinehart and Winston	6	$ 1.84
The above are available from: Holt, Rinehart and Winston 55 Horner Avenue, Toronto 18, Ontario		
English Workshop, Grade 9	3	$ 2.52
Answer Key for above Warringer, Whitten and Blumenthal Harcourt, Brace and Javonovich Supplier: Longman Canada Ltd., 55 Barber Greene Road, Don Mills, 403, Ontario	3	$ 0.92
Writers in Conflict Henderson and Penman Supplier: MacMillan Co. 70 Bond Street, Toronto 2, Ontario	3	$ 2.36
International Reading Lab. IIIa	1 set	$99.75
International Reading Lab. IIIa Student books	30	$ 0.75
Dimensions in Reading Lab Manpower and Natural Resources	1 set	$97.15
The Reading Labs and Student books are available from: Scientific Research Associates, 44 Prince Andrew Place, Don Mills, Ontario		
Exploring Occupations Parmenter Supplier: Guidance Center College of Education University of Toronto 1000 Younge Street Toronto 289, Ontario	3	$ 2.60
Success in the World of Work Parmenter & Gotlib Supplier: Guidance Center College of Education University of Toronto 1000 Younge Street Toronto 289, Ontario	3	$ 2.75

COMMUNICATIONS	NO. REQ'D	NET PRICE EA.
Tools for Life (No.'s 1 - 6) Supplier: Vancouver City College 1595 W 10th Avenue Vancouver 9, B.C.	2	free

It is also necessary to have some information on careers. It is suggested that either of the following be used.

Careers for the 70's (if available) Published by: Queen's Printer, Victoria, B.C.	1	$ 6.00
G.C. Information Monographs About Canadian Occupations Supplier: Guidance Center The College of Education University of Toronto 1000 Younge Street Toronto 289, Ontario	1 set	$23.25

Order the checked items as per the attached list (page 5).

Mylar "Ryton" Sheets Supplier: Associated Audio-Visual Ltd. 1590 W 4th Avenue Vancouver 9, B.C.	10	$ 0.35
Metrication, A Guide for Consumers Second Edition Consumer Research Report No. 2 Department of Consumer and Corporate Affairs Supplier: Information Canada 657 Granville St. Vancouver, B.C.	6	free

COMMUNICATIONS -

G.C. Monographs List (see page 4)

Per copy prices (same title or assorted) are 25¢ each, plus handling and delivery charges.

Order those that are checked - 1 each per class

Quant.	Cat.No.
	01-100
	01-101
	01-102
	01-103
	01-104
	01-105
	01-106
	01-107
	01-108
✓	01-109
✓	01-110
✓	01-111
	01-112
✓	01-114
✓	01-115
✓	01-116
✓	01-117
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✓	01-134
✓	01-135
✓	01-136
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✓	01-138
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✓	01-141
	01-142
	01-143
✓	01-144
✓	01-145

Quant.	Cat.No.
	01-146
	01-147
	01-148
✓	01-149
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✓	01-191

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Quant.	Cat.No.
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✓	01-242
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	01-302
	01-303
	01-304
	01-305
	03-001
	03-002

MATHEMATICS	NO. REQ'D	NET PRICE EA.
Mathematics, A Basic Course Salten & Dever Cambridge Book Co. Supplier: Gage Educational Publications Box 5000 164 Commander Blvd. Agincourt, Ontario		$ 1.84
Key to Mathematics, A Basic Course Salten & Dever Cambridge Book Co. Supplier: Gage Educational Publications Box 5000 164 Commander Blvd. Agincourt, Ontario	3	$ 0.80
Refresher Mathematics + separate ans. key Edwin I. Stein Allyn and Bacon, Inc. Supplier: The MacMillan Co. 70 Bond Street Toronto 2, Ontario	12	$ 5.92 answer key: 2.00
Senior Technical Mathematics A.H. Heywood Supplier: The MacMillan Co. 70 Bond Street Toronto 2, Ontario	3	$ 4.20
Basic Mathematics Bouman & Lindsay Supplier: Holt, Rinehart and Winston 55 Horner Avenue Toronto 18, Ontario	3	$ 4.17
B. Math St. Louis & Jennings Supplier: Sir Isaac Pitman (Canada) Ltd. 495 Wellington Street West Toronto 135, Ontario	3	$ 3.96
General Mathematics, Book 1 Fraser, Hardie and Vaughan Supplier: Ginn and Co. 33 Mobile Drive Toronto 16, Ontario	3	$ 4.16
Learning to Compute, Book 2, Second Edition Jones, Clark and Potter Harcourt, Brace and World Supplier: Longmans, Canada Ltd. 55 Barber Greene Rd. Don Mills, Ontario	3	$ 1.96

MATHEMATICS	NO. REQ'D	NET PRICE EA.
Learn Basic Slide Rule on Your Own (book)	3	$ 2.00
Student Slide Rule - No. 341-3526	3	$ 2.35
Both available from: The Hughes-Owens Co. 3659 Wayburne Drive Burnaby, B.C.		
Geometry sets - including 6" rule	6 sets	$ 0.77
45° triangle, 30-60-90° triangle, compass, and protractor		
Buffalo Math Set #21 Supplier: The Hughes-Owens Co. 3659 Wayburne Drive Burnaby 2, B.C.		
Booklet: Your Money Matters Supplier: The Royal Bank of Canada 1055 West Georgia St. Vancouver, B.C.	12	free
Math Mastery Tapes:		
Set on Introduction to Fraction Concepts	1 set	$90.50
Set on Fractional Number Computation	1 set	$168.00
Supplier: Associated Audio Visual 1590 West 4th Avenue Vancouver 9, B.C.		
Income Tax Guides & T-1 Tax Forms Income Tax Office 1110 West Georgia St. Vancouver, B.C.	25	free
Cassette Tapes and Companion Film Strips		
Learning to Live Together - Filmstrip X203A	1	$ 7.70
Learning to Live Together - cassette tape TX203A	1	$ 6.05
The New Home - Filmstrip X203B	1	$ 7.70
The Budget - Today and Tomorrow - Filmstrip X203C	1	$ 7.70
The Budget - Today and Tomorrow - cassette tape TX203C	1	$ 6.05
Cash and Credit - Filmstrip X203D	1	$ 7.70
How to Shop - Filmstrip X203E	1	$ 7.70
How to Shop - Cassette tape TX203E	1	$ 6.05

MATHEMATICS	NO. REQ'D	NET PRICE EA.
Just Sign Here - Filmstrip X203F Supplier: CENCO - Eye Gate Division Central Scientific Co. of Canada Ltd. 1206 Homer Vancouver, B.C.	1	$ 7.70
B.C. Landlord Tenant Relations Stuart Rush Supplier: Self-Counsel Press Limited 1480 Frances Vancouver, B.C.	1	$ 1.17
SCIENCE		
Science - A Way of Knowing Jacobson, et al. American Book Co. Supplier: Van Nostrand Reinhold Ltd.	6	$ 1.20
The Cell - Basis of Life - Laboratory Research in Science Jacobson, et al. American Book Co. Supplier: Van Nostrand Reinhold Ltd.	6	$ 1.20
The Human Organism - Science & Daily Living Jacobson, et al. American Book Co. Supplier: Van Nostrand Reinhold Ltd.	6	$ 1.20
Ecology - Field Research in Science Jacobson, et al. American Book Co. Supplier: Van Nostrand Reinhold Ltd.	6	$ 1.20
Chemistry - Experimentation in Science Jacobson, et al. American Book Co. Supplier: Van Nostrand Reinhold Ltd.	6	$ 1.20
Energy States - Experimentation in Science Jacobson, et al. American Book Co. Supplier: Van Nostrand Reinhold Ltd.	6	$ 1.20
Electricity and Magnetism - Case Histories in Science Jacobson, et al. American Book Co. Supplier: Van Nostrand Reinhold Ltd.	6	$ 1.20

SCIENCE	NO. REQ'D	NET PRICE EA.
Physical Science, A Modern Approach (Can. Ed) Charles S. Bickel, et al. Van Nostrand Reinhold Ltd.	6	$ 4.52
Laboratory Experiments in Physical Science Bickel, Eigenfeld & Hogg Van Nostrand Co. Inc.	6	$ 2.08
Key to Laboratory Experiments in Physical Science Bickel, Eigenfeld & Hogg Van Nostrand Co. Inc.	3	$ 0.96
The above are all available from: Van Nostrand Reinhold Ltd., 1410 Birchmount Road, Scarborough, Ontario		
Life Science, Cambridge Work-a-Text Stanger and Perkins Cambridge Book Co. Supplier: Gage & Co.	6	$ 2.04
Life Science, Annotated Teachers Edition Stanger & Perkins Cambridge Book Co. Supplier: Gage & Co.	3	$ 3.32
Practical Modern Physics Galembo, et al. Cambridge Book Co. Supplier: Gage & Co.	6	$ 1.28
Answer Key for above	6	1.50
The last four are all available from: Gage & Company 164 Commander Blvd., Box 5000, Agincourt, Ontario		
Science John H. Pomeroy Holt, Rinehart and Winston Inc. 55 Horner Avenue Toronto 18, Ontario	6	$ 2.15
Supermarket Storybook Gary B. Rush Self-Council Press Inc. 1480 Frances St. Vancouver 6, B.C.	6	$ 1.00

SCIENCE	NO. REQ'D	NET PRICE EA.
Healthful Eating Canada Department of Health and Welfare Queen's Printer 657 Granville St. Vancouver, B.C.	6	$ 0.50
Pocket Guide to First Aid St. John Ambulance Society 6111 Cambie Street Vancouver, B.C.	25	$ 0.10
Have a Safe Day B.C. Safety Council 1477 West Pender St. Vancouver, B.C.	6	N/C
Mobile Laboratory and Accessories Catalogue No. 73050-05 Sisco Scientific Ltd. Box 5750, Station A, Calgary 9, Alberta	1	$259.00

Sound Filmstrips (SVE/Singer) 35mm filmstrip plus accompanying cassette
Supplier: Educational Film Distributors Ltd.
285 Lesmill Road
Don Mills, Ontario
M3B 2V1

Titles:	Cat. No.	No. Req'd	Net Price Ea.
Evolution: Theories Past & Present	468-ITC	1	$13.50
Evolution: Abiogenesis vs. Biogenesis	468-2TC	1	$ 7.50
Human Physiology Series (7 filmstrips without cassettes)	570-S	1	$42.75
Drugs in our Society (6 sound filmstrips)	C790-SATC	1	$63.00
Some Ecological Considerations	C797-3TC	1	$16.50
Evolution and Extinction	C797-4TC	1	$10.00

SCIENCE

Sound Filmstrips (Eyegate)
order from: Central Scientific Co.
1206 Homer Street
Vancouver 3, B.C.

Titles:	Cat. No.	No. Req'd	Net Price Ea.
Procedures at the scene of an accident - filmstrip	X228A	1	$ 7.70
Procedures at the scene of an accident - cassette tape	TX228A	1	$ 6.05
Help! This is an Emergency filmstrip	X203L	1	$ 7.70
Help! This is an Emergency cassette tape	TX203L	1	$ 6.05

Silent Filmstrip: National film board
order from: Harry Smith & Sons
1150 Homer Street
Vancouver 3, B.C.
(Audio - Visual Division)

Titles:	Cat. No.	No. Req'd	Net Price Ea.
Electrical Hazards	205C 0158 403	1	$ 5.00

AUDIO - VISUAL	NO. REQ'D	NET PRICE EA.
Dukane Micromatic filmstrip and cassette projector - Model 28A9A including remote control	1	$285.00
Spare bulb for above - Model CAL	1	$ 6.25
Hoffman model 753 listening post	1	$ 32.00
Sony PC - 1 adaptor	3	$ 1.25
15' extension cord with grounded plug	2	$ 3.95

Supplier: Associated Audio Visual
1590 West 4th Avenue
Vancouver 9, B.C.

AUDIO-VISUAL	NO. REQ'D	NET PRICE EA.
Sony TC 110 B cassette recorder	1	$102.95
Sony DR-7 headsets	6	$ 10.00
Supplier: General Distributors Ltd. Box 9400 Winnipeg, Manitoba R3C 3c3		
c - 60 cassette tapes - Superior brand	3	$ .84
Supplier: Cam-Gard Supply Ltd. 2055 Boundary Burnaby, B.C.		

SCIENCE

Miscellaneous laboratory supplies and equipment (as per attached list)	$286.12

Required SCIENCE EQUIPMENT AND SUPPLIES

Order from: Central Scientific Co. of Canada Ltd.,
1206 Homer St.,
Vancouver 3, B.C.

ITEM	QUANTITY	CAT.NO.	NET PRICE EA.	TOTAL
single sheave pulley	2	75625	$ 3.00	$ 6.00
double sheave pulley	2	75626	5.00	10.00
meter stick	1	73120	.95	.95
triple beam balance	1	3620	54.40	54.40
metric hook-weight set	1	9810	10.50	10.50
spring balance	1	5505	1.80	1.80
lever holder	2	75555	.95	1.90
demonstration balance	1	75560	2.50	2.50
Hall's Carriage	1	75850	3.85	3.85
inclined plane board & pulley	1	75845	4.25	4.25
overflow can	1	76520	1.70	1.70
centigrade thermometer	4	19240-1	.65	2.60
ball and ring	1	77450	3.15	3.15
compound bar	1	77455	.95	.95
calorimeter	1	77970	4.40	4.40
pith balls	1 pkg.	78650-1	2.97	2.97
friction rod-glass	1	78605	1.77	1.77
friction rod-rubber	1	78620	.67	.67
St. Louis motor	1	79945	11.50	11.50
AC armature (for motor)	1	79949	13.00	13.00
magnetic compass	2	78430-3	.28	.56
power supply	1	79562	41.25	41.25
galvanometer	1	82102-1	19.85	19.85
knife switch	1	84315	.55	.55
copper magnet wire	1 spool	89570-22	1.60	1.60
copper wire (bare)	1 spool	89560-22	1.08	1.08
support ring set	1 set	18011	5.70	5.70
buret clamp	2	12102	3.70	7.40
test tube clamp	2	12155	.21	.42
pinchcock	2	12182	.35	.70
crucible tongs	1	19630	.50	.50
wire gauze	2	19965-2	.29	.58
test tube support	1	19190	2.15	2.15
rubber stoppers	1 pkg.	18153-1	1.40	1.40
glass tubing	1 lb.	14079	1.25	1.25
rubber tubing	10 ft.	18220-2	.09	.90
Kimax beakers-150 ml	3	14264-150	.50	1.50
Kimax beakers-250 ml	3	14264-250	.50	1.50
crucible	2	18535-15	.23	.46
graduated cylinder	2	16096-100	1.65	3.30
Kimax flask-250 ml	2	14804-250	1.15	2.30
Kimax flask-500 ml	2	14804-500	1.45	2.90
Kimax flask-1000 ml	1	14804-1L	1.90	1.90
thistle tube	2	15705-1	.58	1.16
collecting jar	2	10325-50	.27	.54
Kimax test tubes	12	15788-4	.09	1.08
pneumatic trough	1	19799	4.08	4.08

ITEM	QUANTITY	CAT. NO.	TOTAL
calcium carbonate	1 lb.	1322C	$ 2.35
calcium chloride	500 g.	1320C	1.85
cupric sulfate	1 lb.	3222C	5.15
hydrochloric acid	1 lb.	1332H	2.25
iron metal filings	1 lb.	78395	.75
ammonium hydroxide	1 lb.	2662A	2.00
ammonium chloride	1 lb.	2374A	1.95
manganese dioxide	100 g.	1420M	2.60
potassium nitrate	1 lb.	2904P	3.50
potassium chlorate	1 lb.	2443P	2.60
sodium carbonate	500 g.	1750S	1.45
sodium thiosulfate	1 lb.	2812S	2.15
sodium hydroxide	32 oz.	2244S	3.95
sodium chloride	1 lb.	1792S	1.15
sulfuric acid	1 lb.	3482S	2.50
zinc metal mossy	100 g.	1050Z	4.15
blue litmus paper	1 vial	1050TP	.15
red litmus paper	1 vial	1110TP	.15
pyrex beakers - 400 ml	2	14265-640	1.40
pyrex beakers - 1000 ml	2	14265-691	3.20
test tube brushes	3	10966-011	1.05
spatulas	2	18744-001	1.30
funnel	1	15083-610	1.40
glass tubing cutter	1	13982-000	2.80
TOTAL			$51.80

RECOMMENDED

Dent's Canadian School Atlas
J.M. Dent and Sons (Canada) Ltd.,
Toronto, Ontario

Pocket Thesaurus

Current Almanac

Encyclopedia - World Book is good - $160.00

APPENDIX VII

STATISTICAL APPENDIX

Phase I 1973

Statistical Appendix

Several types of statistical analyses were performed on the data from this project. Due to the small number of students involved and the lack of control of outside factors, most of the non-demographic results found are not too reliable and no hard conclusions should be drawn from them, but they are, none the less, interesting. The demonstration and comparison groups were compared on the basis of demographic variables and testing results and what follows is a summary of the interesting results that came out.

Variable	VAST	Comparison
Sex	46.03% Males 53.97% Females	35.71% Males 64.29% Females
Age	Mean = 26 Median = 22 61.9 % ≤ 25	Mean = 25 Median = 22 69.05% ≤ 25
Last grade completed	Mean = 8.3 Median = 8.0 84.13% ≥ 8.0	Mean = 8.3 Median = 8.0 88.1% ≥ 8.0
Time out of school	68.25% ≤ 10 years	73.81% ≤ 10 years
Work status prior to course	22.2% employed full time 63.5% unemployed and seeking	11.9% employed full time 78.6% unemployed and seeking
Last occupation	21% waitress highest percentage	32.5% waitress highest percentage
Number of months last job	Mean = 18.3 Median = 4.0 64.5% ≤ 6	Mean = 10.95 Median = 4.0 67.5% ≤ 6
Average number of hours per week last job	Mean = 38.1 Median = 40.0	Mean = 41.4 Median = 40.0
Average gross wages per week last job	Mean = 97.90 Median = 82.00	Mean = 101.65 Median = 90.00
Usual occupation past 36 months	21.7% waitress highest percentage	29.7% waitress highest percentage

Variable	VAST	Comparison
Number of months employed full time past 36 months	Mean = 18.5 Median = 18.0	Mean = 18.75 Median = 18.5
Number of months unemployed and seeking past 36 months	Mean = 11.1 Median = 11.0	Mean = 11.8 Median = 9.5
Number of times unemployed past 36 months	Mean = 2.9 Median = 3.0 92.1% ≤ 5	Mean = 2.3 Median = 2.0 95.2% ≤ 5
Attended past BTSD course	4.76% yes 95.24% no	11.9% yes 88.1% no
Revised Beta	Mean = 103.9 Median = 105.0 62.3% average 27.9% above average	Mean = 105.9 Median = 106.0 59.5% average 35.7% above average

A Note on the Meaning of Significance Levels

If the difference or relationship between two variables is significant at say the .01 level then this difference or relationship represents the true state of affairs, on average, 99 per cent of the time, and only 1 per cent of the time will this difference or relationship appear by chance, i.e., only, on average, 1 per cent of the time will this difference or relationship not be the true state of affairs.

As noted in the main text of this report, a t-test for significant differences was applied to the differences between the pre- and post-test of each section of TABE for each group. This difference was significant at the .001 level for each part of TABE, including the total battery score for each group.

Variable	VAST	Comparison
TABE-READING grade change	Mean = 4.3 Median = 4.0 11.8% changed 1-1.9 grades 45.1% changed 2-2.9 grades 41.2% changed 3-3.9 grades	Mean = 4.2 Median = 4.0 22.2% changed 1-1.9 grades 37.0% changed 2-2.9 grades 37.0% changed 3-3.9 grades
TABE-ARITHMETIC grade change	Mean = 4.0 Median = 4.0 27.45% changed 1-1.9 grades 31.37% changed 2-2.9 grades 35.29% changed 3-3.9 grades	Mean = 3.9 Median = 4.0 33.33% changed 1-1.9 grades 40.74% changed 2-2.9 grades 14.81% changed 3-3.9 grades

Variable	VAST	Comparison
TABE-LANGUAGE grade change	Mean = 4.4 Median = 4.0 7.84% changed 1-1.9 grades 41.18% changed 2.2.9 grades 43.14% changed 3-3.9 grades 5.88% changed 4-4.9 grades	Mean = 4.3 Median = 5.0 18.52% changed 1-1.9 grades 25.93% changed 2-2.9 grades 40.74% changed 3-3.9 grades 11.11% changed 4-4.9 grades
TABE-TOTAL grade change	Mean = 4.2 Median = 4.0 7.84% changed 1-1.9 grades 56.86% changed 2-2.9 grades 33.33% changed 3-3.9 grades	Mean = 4.1 Median = 4.0 22.22% changed 1-1.9 grades 48.15% changed 2-2.9 grades 29.63% changed 3-3.9 grades

The results from the use of the LSPCL tell us little and there is nothing startling. There are six LSPCL factors plus a total score. These factors are:

I. Absence of goals and self-direction; inability to plan ahead; discouragement and apathy.

II. Lack of awareness and involvement in the community.

III. Family disorganization.

IV. Impulsiveness and carelessness re money.

V. Alienation and health problems.

VI. Lack of financial knowledge.

Variable	VAST	Comparison
LSPCL Factor I change	Mean = 3.65 standard deviation = 9.76	Mean = 3.52 standard deviation = 7.61
LSPCL Factor II change	Mean = 3.72 standard deviation = 7.39	Mean = 3.96 standard deviation = 8.04
LSPCL Factor III change	Mean = -.17 standard deviation = 3.79	Mean = 1.185 standard deviation = 2.195
LSPCL Factor IV change	Mean = 1.28 standard deviation = 3.215	Mean = 1.52 standard deviation = 4.52

Variable	VAST	Comparison
LSPCL Factor V change	Mean = -.17 - standard deviation = 2.68	Mean = .59 standard deviation = 2.30
LSPCL Factor VI change	Mean = 1.13 standard deviation = 2.17	Mean = 1.04 standard deviation = 2.44
LSPCL Total score change	Mean = 9.5 standard deviation = 22.15	Mean = 12.185 standard deviation = 19.59

T-tests for significant differences were applied to the differences between the pre- and post-test of each factor plus the total score for each group. The following table gives the levels of significance arising from these tests.

Variable	VAST	Comparison
LSPCL Factor I	.05	.05
LSPCL Factor II	.01	.05
LSPCL Factor III		.05
LSPCL Factor IV	.05	
LSPCL Factor V		
LSPCL Factor VI	.01	.05
LSPCL Total score	.01	.01

Nothing much can really be said about these results as there is little difference between the groups.

The last type of statistical analysis done was correlation. Correlation is conerned with describing the degree of relation between variables. What follows is a table of significant results found in the correlations that were done. The first two columns name the two variables being correlated. The first variable in each pair will be the X-variable the second one will be the Y-variable. The next two columns give the significance levels of first the VAST group, then the comparison group. The entry in each of these two columns will be, blank, .05, .01, or .001, which means, not significant, significant at a .05 level, significant at a .01 level, and significant at .001 level respectively. The (+) or (-) beside each value indicates whether the two variables are positively or negatively related. If X and Y are positively related then as X increases in value, Y tends to also increase in value, but if X and Y are negatively related, then as X decreases in value, Y tends to increase in value.

Variables Being Correlated			
Variable X	Variable Y	VAST	Comparison
Sex (1 = MALE/2 = FEMALE)	Average number of hours work per week, last job		.05(-)
Sex (1 = MALE/2 = FEMALE)	Average gross wages per week last job	.001(-)	.01(-)
Sex (1== MALE/2 = FEMALE)	Total earnings past 12 months	.01(-)	.001(-)
Sex (1 = MALE/2 = FEMALE)	Number of months employed full time last 36 months		.01(-)
Sex (1 = MALE/2 = FEMALE)	Revised Beta score	.05(+)	
Sex (1 = MALE/2 = FEMALE)	TABE-READING pre-test	.05(+)	
Sex (1 = MALE/2 = FEMALE)	TABE-LANGUAGE pre-test	.001(+)	.05(+)
Sex (1 = MALE/2 = FEMALE)	TABE-TOTAL pre-test	.05(+)	
Sex (1 = MALE/2 = FEMALE)	TABE-LANGUAGE change	.05(+)	
Sex (1 = MALE/2 = FEMALE)	TABE-TOTAL change	.05(+)	
Sex (1 = MALE/2 = FEMALE)	LSPCL Factor V change	.05(+)	
Sex (1 = MALE/2 = FEMALE)	LSPCL Total change	.05(+)	
Age	Last grade completed		.01(-)
Age	Number of months in last job	.001(+)	
Age	Number of months employed full time last 36 months		.05(+)
Age	TABE-READING pre-test		.01(-)
Age	Grade day change arithmetic	.05(+)	
Last grade completed	TABE-READING pre-test	.05(+)	
Last grade completed	TABE-ARITHMETIC pre-test	.001(+)	.05(+)
Last grade completed	TABE-LANGUAGE pre-test	.01(+)	
Last grade completed	TABE-TOTAL pre-test	.01(+)	.05(+)
Last grade completed	TABE-ARITHMETIC change		.05(+)

Variables Being Correlated			
Variable X	Variable Y	VAST	Comparis
Time out of school	Number of months in last job	.001(+)	
Time out of school	Number of months employed full time last 36 months		.01(+)
Time out of school	Number of months unemployed last 36 months	.05(-)	
Time out of school	Number of months other training last 36 months	.05(-)	
Time out of school	TABE-READING pre-test		.05(-)
Time out of school	LSPCL Factor IV change	.01(+)	
Time out of school	LSPCL Total change	.05(+)	
Work status prior to course	TABE-LANGUAGE pre-test		.05(+)
Work status prior to course	LSPCL Factor I change		.01(+)
Work status prior to course	LSPCL Factor VI change	.05(+)	
Number of months in last job	Number of months employed full time last 36 months		.05(+)
Number of months in last job	Number of months unemployed last 36 months		.01(+)
Number of months in last job	Number of times unemployed last 36 months	.01(-)	
Number of months employed full time last 36 months	LSPCL Factor IV change	.01(+)	
Number of months employed full time last 36 months	LSPCL Factor VI change		.05(-)
Number of months employed full time last 36 months	LSPCL Total change	.05(+)	

Variables Being Correlated			
Variable X	Variable Y	VAST	Comparison
Number of months unemployed last 36 months	Total possible days in course	.01(-)	
Number of months unemployed last 36 months	Actual days attended	.001(-)	
Number of months unemployed last 36 months	Attendance rate	.01(-)	
Number of months other training last 36 months	Actual days attended	.05(+)	
Number of months other training last 36 months	TABE-READING pre-test		.05(-)
Number of months other training last 36 months	TABE-ARITHMETIC pre-test		.05(-)
Number of months other training last 36 months	TABE-LANGUAGE pre-test		.05(-)
Number of months other training last 36 months	TABE-TOTAL pre-test		.05(-)
Number of months other training last 36 months	LSPCL Factor III pre-test		.001(+)
Number of months other training last 36 months	LSPCL Factor IV pre-test	.05(-)	
Attended past BTSD course (1 = YES/ 2 = NO)	TABE-READING pre-test	.001(+)	
Attended past BTSD course (1 = YES/ 2 = NO)	TABE-ARITHMETIC pre-test	.05(+)	
Attended past BTSD course (1 = YES/ 2 = NO)	TABE-LANGUAGE pre-test	.001(+)	
Attended past BTSD course (1 = YES/ 2 = NO)	TABE-TOTAL pre-test	.001(+)	

Variables Being Correlated			
Variable X	Variable Y	VAST	Compari
Total possible days in course	LSPCL Factor II change		.05(+)
Total possible days in course	LSPCL Factor V change		.05(+)
Revised Beta score	TABE-READING pre-test	.001(+)	.01(+)
Revised Beta score	TABE-ARITHMETIC pre-test	.001(+)	.001(+
Revised Beta score	TABE-LANGUAGE pre-test	.001(+)	.05(+)
Revised Beta score	TABE-TOTAL pre-test	.001(+)	.001(+
Revised Beta score	TABE-ARITHMETIC change	.01(+)	
Revised Beta score	TABE-LANGUAGE change	.01(+)	
Revised Beta score	TABE-TOTAL change	.01(+)	
Revised Beta score	Grade-day change Arithmetic	.01(-)	
Revised Beta score	Grade-day change Language	.01(-)	
Revised Beta score	Grade-day change Total	.05(-)	
TABE-READING pre-test	TABE-ARITHMETIC change	.001(+)	.05(+)
TABE-READING pre-test	TABE-LANGUAGE change	.01(+)	
TABE-READING pre-test	TABE-TOTAL change	.01(+)	
TABE-READING pre-test	Grade-day change Arithmetic	.01(-)	.01(-)
TABE-READING pre-test	Grade-day change Language	.05(-)	
TABE-READING pre-test	Grade-day change Total	.05(-)	
TABE-ARITHMETIC pre-test	TABE-ARITHMETIC change	.001(+)	
TABE-ARITHMETIC pre-test	TABE-LANGUAGE change	.05(+)	
TABE-ARITHMETIC pre-test	TABE-TOTAL change	.01(+)	
TABE-ARITHMETIC pre-test	ATTENDANCE RATE	.05(+)	.05(+)
TABE-ARITHMETIC pre-test	Grade-day change Arithmetic	.001(-)	
TABE-ARITHMETIC pre-test	Grade-day change Language	.01(-)	

Variables Being Correlated		VAST	Comparison
Variable X	Variable Y		
TABE-ARITHMETIC pre-test	Grade-day change Total	.05(-)	
TABE-LANGUAGE pre-test	TABE-ARITHMETIC change	.01(+)	
TABE-LANGUAGE pre-test	TABE-TOTAL change	.05(+)	
TABE-LANGUAGE pre-test	Grade-day change Arithmetic	.01(-)	
TABE-LANGUAGE pre-test	Grade-day change Language	.05(-)	
TABE-LANGUAGE pre-test	Grade-day change Total	.01(-)	
TABE-TOTAL pre-test	TABE-ARITHMETIC change	.001(+)	.05(+)
TABE-TOTAL pre-test	TABE-LANGUAGE change	.05(+)	
TABE-TOTAL pre-test	TABE-TOTAL change	.01(+)	
TABE-TOTAL pre-test	Grade-day change Arithmetic	.001(-)	.05(-)
TABE-TOTAL pre-test	Grade-day change Language	.01(-)	
TABE-TOTAL pre-test	Grade-day change Total	.01(-)	

Mathematics Diagnosis

UNIT I: WHOLE NUMBERS

NAME: _____

DATE: _____

	OBJECTIVE
1. Count the letters in the box below, and indicate the number of letters present. a l q z s x w e d c v f r t g b y n h u j	A-1
2. What is the place value of the 6 in 4,600? _____	A-2
3. Write 1,206,047 in words. _____	A-3
4. Write "seventy-two thousand, forty-eight" using numerals. _____	A-4
5. Arrange these numbers in order from smallest to largest - 280, 9890, 8980, 890, 8890, 28. ____, ____, ____, ____, ____, ____.	A-5
6. Round off 42,635 to the nearest: a. ten _____ b. hundred _____ c. thousand _____	A-6
7. a. What is the total of 16 and 3 ? _____ b. Adding 8 and 5 we get - _____ c. The sum of 20 and 10 is - _____	B-1, B-2
8. Write "eight plus five equals thirteen" in symbols. _____	B-3

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9. Add and show your work here. B-4, B-5, B-2

a. $\begin{array}{r} 9 \\ +\ 7 \\ \hline \end{array}$ b. $\begin{array}{r} 426 \\ +\ 32 \\ \hline \end{array}$ c. $\begin{array}{r} 1048 \\ +\ 907 \\ \hline \end{array}$

d. 427 + 26 + 1042 = _____

10. a. The difference of 8 and 5 is _____ C-1

b. Thirteen minus ten is _____

11. Write "seven minus five equals two" in symbols. C-2

_____

12. Subtract and show your work here. C-3, C-4

a. $\begin{array}{r} 9 \\ -\ 7 \\ \hline \end{array}$ b. $\begin{array}{r} 28 \\ -\ 19 \\ \hline \end{array}$ c. $\begin{array}{r} 2906 \\ -\ 209 \\ \hline \end{array}$ d. 428 - 62 =

_____

13. a. 7 times 2 is _____ D-1

b. Six three's are _____

14. Write "four times three is twelve" in symbols. D-2

_____

15. Rewrite 5 x 2 = 10 as addition. D-3

_____

16. Multiply and show your work here. D-4, D-5

a. $\begin{array}{r} 9 \\ \times\ 7 \\ \hline \end{array}$ b. $\begin{array}{r} 27 \\ \times\ 10 \\ \hline \end{array}$ c. $\begin{array}{r} 420 \\ \times\ 9 \\ \hline \end{array}$ d. $\begin{array}{r} 367 \\ \times\ 115 \\ \hline \end{array}$

e. 221 x 19 = _____

17. a. Eight divided by two is _____ E-1

b. Four into twelve goes _____ times.

18. Divide and show your work here. E-2, E-3 E-4

a. $1\overline{)21}$ b. $9\overline{)99}$ c. $6\overline{)3612}$

d. $42\overline{)1320}$ e. $100\overline{)2100}$ f. $256\overline{)1600}$

19. A book shelf unit has 4 shelves. The first shelf has 9 books, the second 14 books, the third 47 books and the fourth 28 books. How many books are in the shelf unit? Show your work. B-6

_____

20. A man has weekly pay of 95 dollars. Before he gets his cheque 36 dollars are taken off for taxes. How much does he have to spend? Show your work. C-5

21. If you live 8 blocks from the school and it takes you 2 minutes to walk a block, how long does it take you to walk to school? Show your work. D-6

22. If you have 56 dollars a week, how much do you have to spend each day? Show your work. E-5

23. If you were working for 2 dollars per hour and worked 5 hours on Monday, 8 hours on Tuesday, 10 hours on Wednesday, 7 hours on Thursday, and were sick on Friday and Saturday, how much would you earn in the week? Show your work. B-6, D-6

24. You are buying a car priced at 2,100 dollars and are given 800 dollars for your old car. If the finance charges are 308 dollars, how much will you have to pay each month for 24 months to pay for it? Show your work. F-2

25. An N.H.L. team went on a road trip. Each of the 16 players was allowed 100 dollars for hotel and meals in addition to a 362 dollar plane ticket. In filing his report of expenses the manager had to complete the following: F-2

PLAYER COSTS

Total meals and hotels _____

Total air tickets _____

Total trip expenses _____

Calculate these for the manager and put the answers in the proper place in the report. Show your work.

MATHEMATICS

UNIT I: WHOLE NUMBERS

ITEM A: READING, WRITING, AND ROUNDING OFF

OBJECTIVES

The student must be able to:

1. Count up to 100 and state or write the number counted in words or symbols.
2. Identify the place value of a digit or numeral to 10 million.
3. Read numbers to 10 million.
4. Write numbers to 10 million after reading the word name of the number.
5. Arrange a set of numbers in a given order.
6. Round off numbers to nearest ten, hundred, thousand, or ten thousand.

LEARNING RESOURCES

Books: Basic Mathematics, Bouman and Lindsay
General Mathematics, Ginn and Company
Mathematics, A Basic Course, Cambridge Book Company
Refresher Mathematics, Stein

LEARNING ACTIVITIES

If you missed any of objectives 1 to 5 on the Diagnosis, get a copy of Refresher Mathematics and read page 19 and the top part of page 20. Then write the Diagnostic Test on page 20 doing only the odd numbered questions (omit 11 and 13). Check your answers with those in the back of the book. Do sets in the "related practice examples" on page 20 and 21 which correspond to the questions you missed in the Diagnostic Test (for example, if you missed question 3, do set 3 as an exercise).

Information for objective 6 is found on page 22 of Refresher Mathematics. After reading this, do the Diagnostic Test at the bottom of the page (questions 1 to 4 only) and check your answers. Do sets in the "related practice examples" on page 23 which correspond to the questions you missed in the Diagnostic Test (for example, if you missed question 3, do set 3 as an exercise).

If your work is correct to this stage, you are ready to write Item Progress Check IA, Form 1. If you need further assistance, use one or more of the following:

Objective	Source Materials	Page(s)	Content
1,2,3,4	Basic Mathematics	1, 10-12	information & exercises
6	"	13-15	"
1,2,3,4,5,	Mathematics, A Basic Course	1-3	"
6	"	5-7	"
1	General Mathematics	1,2	information
2,3,4	"	4-6	information & exercises

After you have written Item Progress Check IA, Form 1, and have met the criterion, go on to the next Item as indicated on your Diagnosis. If you do not meet the criterion, select additional work from the above table and, after completing it, write Item Progress Check IA, Form 2. If you now meet the criterion, go on to the next Item shown on your Diagnosis. If not, see your instructor.

If you have now completed all the work in Unit I, you are ready to write Unit Progress Test I, Form I. If you meet the criteria, do Diagnosis II. If not, see your instructor.

Mathematics Item Progress Check

UNIT I: WHOLE NUMBERS Name: _____

ITEM A: READING, WRITING, AND ROUNDING OFF Date: _____

Form I

Criterion: 14 / 14
Score: ___/___

(1) 1. Count the letters in the box.

A F G L C L D F Y A X W D R V G Y N J

_____

(5) 2. Write the place value of the 5 in the following numbers.

a. 5,041 _____ d. 500,000 _____

b. 4,205 _____ e. 15,476,123 _____

c. 6,521 _____

(1) 3. Write "four hundred three thousand, two hundred fifty-three" using digits.

_____

(3) 4. Write the following numbers in words.

a. 263 _____

b. 6,242 _____

c. 15,460 _____

(1) 5. Rewrite these numbers in order from smallest to largest.

9, 9890, 8989, 890 _____, _____, _____, _____.

(3) 6. Round off the following number to the indicated values.

a. 4,763 (nearest ten) _____

b. 4,763 (nearest hundred) _____

c. 4,763 (nearest thousand) _____

Mathematics Item Progress Check

UNIT I: WHOLE NUMBERS

ITEM A: READING, WRITING AND ROUNDING OFF

Name: _____

Date: _____

Form 2

Criterion: 13/14

Score: ___/___

(1) 1. Count the letters in the box.

P	L	O	K	I	M	J	U	N	H	Y	B	G	T	R	F	V	C	D	E	W	S	X	A

_____

(5) 2. Write the place value of the "7" in each of the following.

a. 74 _____

b. 167 _____

c. 70,402 _____

d. 1,467,263 _____

e. 63,702 _____

(1) 3. Write "forty-three thousand, three hundred two" using digits.

_____

(3) 4. Write the following numbers in words.

a. 461 _____

b. 21 _____

c. 47,207 _____

(1) 5. Rewrite these numerals from smallest to largest.

4, 8940, 9840, 4890, _____, _____, _____, _____.

(3) 6. Round off 10,463 to the nearest:

a. ten _____

b. hundred _____

c. thousand _____

MATHEMATICS

UNIT I: WHOLE NUMBERS

ITEM B: ADDITION

OBJECTIVES

The student must be able to:

1. Identify "sum" and "total" as being the same thing.
2. Perform additions such as:

   What is the total of 2 and 3?

   Find the sum of 2 and 3.

   Add 2 + 3 .

   2 plus 3 is ____?

3. Write sentences using the symbols "+" and "=" correctly, such as:

   2 + 3 = 5

4. Add zero to any number.
5. Find the sum of large numbers including cases where carrying is needed.
6. Use addition in solving word problems.

LEARNING RESOURCES

Books: Basic Mathematics, Bouman and Lindsay
General Mathematics, Ginn and Company
Learning to Compute, Harcourt, Brace & World, Inc.
Mathematics, A Basic Course, Cambridge Book Company
Refresher Mathematics, Stein

LEARNING ACTIVITIES

If you missed any of the objectives 1 to 5 on the Diagnosis, get a copy of Refresher Mathematics and read pages 24 and 25. Then write the Diagnostic Test on page 26 doing only the odd numbered questions. Check your answers with those in the back of the book. Do sets in the "related practice examples" on pages 26 to 31 which correspond to the questions you missed in the Diagnostic Test (for example, if you missed question 3, do set 3 as an exercise).

Information for objective 6 is found on page 44 of Basic Mathematics. After reading page 44, do any four problems on page 45 and check your answers. Do several other problems from page 45 if you have made some errors in your first four problems.

If your work is correct to this stage, you are ready to write Item Progress Check IB, Form 1. If you need further assistance, use one or more of the following:

Objective	Source Materials	Page(s)	Content
2,3,4	Basic Mathematics	26,27	information & exercises
2,3	" "	31-36	"
5	" "	36-40	"
1,2,3,4,5,6	Mathematics, A Basic Course	7-9	"
2	Learning to Compute	1-5	exercises
5	"	8,9	"
6	"	2,4,5,8	problems
6	Refresher Mathematics	32-34	"
1	General Mathematics	24	information & exercises
4	"	26	"

After you have written Item Progress Check IB, Form I, and have met the criterion, go on to the next Item as indicated on your Diagnosis. If you do not meet the criterion, select additional work from the above table and, after completing it, write Item Progress Check IB, Form 2. If you now meet the criterion, go on to the next Item shown on your Diagnosis. If not, see your instructor.

If you have now completed all the work in Unit I, you are now ready to write Unit I Progress Test, Form 1. If you meet the criterion, do Diagnosis II. If not, see your instructor.

Mathematics Item Progress Check

UNIT I: WHOLE NUMBERS Name: _____

ITEM B: ADDITION Date: _____

Form I

Criterion: 19 / 19

Score: ___/___

(1) 1. Write "two plus three equals five" with symbols.

_____

(3) 2. a. What is the total of 4 and 5? _____

b. What is the sum of 4 and 5? _____

c. Four plus five is: _____

(6) 3. Perform these operations.

a. 2 + 5 = _____ d. 2 + 0 = _____

b. 17 + 2 = _____ e. 7 + 3 = _____

c. 19 + 3 = _____ f. 3 + 7 = _____

(5) 4. Find the sum in each of these.

a. $\begin{array}{r} 42 \\ \underline{8} \end{array}$ b. $\begin{array}{r} 27 \\ \underline{310} \end{array}$ c. $\begin{array}{r} 336 \\ \underline{49} \end{array}$ d. $\begin{array}{r} 10600 \\ \underline{2510} \end{array}$ e. 267+3+49= _____

Problems: In the space below, show the work you do to solve problems. One mark is for your work, and one mark is for the correct answer.

(2) 5. Mrs. Smith bought 12 oranges, 6 apples, 10 peaches and 33 prunes. How many pieces of fruit did she buy all together?

_____

_____

_____

(2) 6. Abe Black ran his tractor 30 miles before morning coffee time, 29 miles before lunch, 20 miles before mid-after afternoon coffee break and 27 miles before supper. What was the total mileage for the day?

Mathematics Item Progress Check

UNIT I: WHOLE NUMBERS Name: _____

ITEM B: ADDITION Date: _____

Form 2

Criterion: 18/19

Score: __/__

(1) 1. Write "five plus three is eight" in symbols.

_____

(3) 2. a. What is the sum of 3 and 8? _____

b. The total of 3 and 8 is _____

c. Eight plus three is _____

(6) 3. Perform these operations.

a. 6 + 3 = _____ d. 4 + 0 = _____

b. 3 + 6 = _____ e. 203 + 1 = _____

c. 9 + 4 = _____ f. 2 + 4 + 5= _____

(5) 4. Add the following.

a. $\begin{array}{r} 12 \\ \underline{8} \end{array}$ b. $\begin{array}{r} 31 \\ \underline{269} \end{array}$ c. $\begin{array}{r} 5042 \\ \underline{163} \end{array}$ d. $\begin{array}{r} 427 \\ \underline{184} \end{array}$ e. 27 + 3 + 242= _____

Problems: In the space below, show the work you do to solve problems. One mark is for your work, and one mark is for the correct answer.

(2) 5. Jack caught 11 perch, 14 trout, and 10 jackfish. What was the total number of fish caught?

(2) 6. June Ask knitted 437 stitches and then was interrupted by a telephone call. Later she knitted another 664. After supper she continued and knitted a further 800. What was the total number of stitches knitted by June?

MATHEMATICS

UNIT I: WHOLE NUMBERS

ITEM C: SUBTRACTION

OBJECTIVES

The student must be able to:

1. Perform subtraction given instructions such as:

   4 minus ? is 3 .
   Subtract 1 from 4 .
   Find the difference between 4 and 1 .
   If you had 4 and gave 1 away, you have ? left.

2. Write a sentence using the symbols '-' and '=' correctly.

3. Subtract zero from any number.

4. Find the difference between two large numbers including cases where borrowing is required.

5. Use subtraction in solving word problems.

LEARNING RESOURCES

Books: Basic Mathematics, Bouman and Lindsay
General Mathematics, Ginn and Company
Learning to Compute, Harcourt, Brace & World, Inc.
Mathematics, A Basic Course, Cambridge Book Company
Refresher Mathematics, Stein

LEARNING ACTIVITIES

If you missed any of objectives 1 to 4 on the Diagnosis, get a copy of Refresher Mathematics and read pages 35 and 36. Then write the Diagnostic Test on page 37 doing only the odd numbered questions. Check your answers with those in the back of the book. Do sets in the "related practice examples" on pages 37 to 40 which correspond to the questions you missed in the Diagnostic Test (for example, if you missed question 3, do set 3 as an exercise).

Information for objective 5 is found on page 103 of Basic Mathematics. Do any four problems on page 103 and check your answers. Do several other problems from page 103 if you have made some errors in your first four problems.

If your work is correct to this stage, you are ready to write Item Progress Check IC, Form 1. If you need further assistance, use one or more of the following:

Objective	Source Materials	Page(s)	Content
1	Basic Mathematics	81-94	information & exercises
"	"	95, 96	"
1,2	Mathematics, A Basic Course	10, 11	"
5	"	11, 12	problems
1	Learning to Compute	19, 20	exercises
4	"	22, 23	"
5	"	22, 23	problems
5	Refresher Mathematics	40, 41	"
1,2,5	General Mathematics	27	information
3	"	28	information & exercises

After you have written Item Progress Check IC, Form 1, and have met the criterion, go on to the next Item as indicated on your Diagnosis. If you do not meet the criterion, select additional work from the above table and, after completing it, write Item Progress Check IC, Form 2. If you now meet the criterion, go on to the next Item shown on your Diagnosis. If not, see your instructor.

If you have now completed all the work in Unit I, you are now ready to write Unit I Progress Test, Form 1. If you meet the criterion, do Diagnosis II. If not, see your instructor.

Mathematics Item Progress Check

UNIT I: WHOLE NUMBERS Name: _____

ITEM C: SUBTRACTION Date: _____

Form 1

Criterion:	19/19
Score:	___/___

(4) 1. a. The difference of 5 and 3 is _____.

b. Subtracting 4 from 8 you get _____.

c. If you had 20 apples and ate 7 you would have____.

d. Seven minus four is _____.

(1) 2. Write 'nine minus four is five' in symbols._____.

(5) 3. Do the following:

a. 5 - 3 = _____ d. 9 - 0 = _____

b. 9 - 7 = _____ e. 11 - 9 = _____

c. 51 - 9 = _____

(5) 4. Subtract.

a. $\begin{array}{r} 689 \\ -\ 42 \\ \hline \end{array}$ b. $\begin{array}{r} 653 \\ -\ 37 \\ \hline \end{array}$ c. $\begin{array}{r} 850 \\ -\ 21 \\ \hline \end{array}$ d. $\begin{array}{r} 8760 \\ -\ 602 \\ \hline \end{array}$ e. 968 - 47 = _____

Problems: In the space below, show the work you do to solve problems. One mark is for your work, and one mark is for the correct answer.

(2) 5. George travelled a distance of 237 miles. While covering this distance he walked 48 miles and hitch-hiked the rest. How many miles did he hitch-hike?

(2) 6. Hal had 346 watermelons shipped on the train. During the trip 75 of these were broken. How many unbroken ones arrived?

Mathematics Item Progress Check

UNIT I: WHOLE NUMBERS

ITEM C: SUBTRACTION

Form 2

Criterion:	18 / 19
Score:	___ / ___

(4) 1. a. The difference of 9 and 2 is _____.

b. Subtracting 15 from 21 you get _____.

c. If you have 24 dollars and spend 20 you have_____.

d. Fifteen minus ten is _____.

(1) 2. Write 'eight minus three is five' in symbols.

_____.

(5) 3. Do the following:

a. 6 - 4 = _____ d. 6 - 0 = _____

b. 8 - 1 = _____ e. 12 - 8 = _____

c. 63 - 7 = _____

(5) 4. Subtract:

a. $\begin{array}{r} 579 \\ \underline{63} \end{array}$ b. $\begin{array}{r} 542 \\ \underline{27} \end{array}$ c. $\begin{array}{r} 760 \\ \underline{42} \end{array}$ d. $\begin{array}{r} 7940 \\ \underline{909} \end{array}$ e. 497 - 33 = _____

Problems: In the space below, show the work you do to solve problems. One mark is for your work, and one mark is for the correct answer.

(2) 5. Mabel prepared 48 ounces of orange juice. Her daughter drank 7 ounces, her youngest son drank 12 ounces, and her oldest son drank 10 ounces. How much remained?

(2) 6. A salesman travelled a total of 789 miles, of which 693 was by airplane and the remainder by car. What was the distance covered by car?

MATHEMATICS

UNIT I: WHOLE NUMBERS

ITEM D: MULTIPLICATION

OBJECTIVES

The student must be able to:

1. Perform multiplication given instructions such as:

   3 times 2 is 6.

   Three two's are 6.

   The product of 3 and 2 is 6.

2. Write sentences using the symbols 'x' and '=' correctly.

3. Rewrite multiplication as addition (3x2 = 2+2+2).

4. Multiply by '0' and '1'.

5. Find the product of a given pair of large numbers including cases where carrying is needed.

6. Use multiplication of whole numbers in solving word problems.

LEARNING RESOURCES

Books: Basic Mathematics, Bouman and Lindsay
General Mathematics, Ginn and Company
Learning to Compute, Harcourt, Brace & World Inc.
Mathematics, A Basic Course, Cambridge Book Company
Refresher Mathematics, Stein

LEARNING ACTIVITIES

If you missed any of the objectives 1 to 5 on the Diagnosis, get a copy of Refresher Mathematics and read pages 43 and 44. Then write the Diagnostic Test A on page 45 doing only the odd numbered questions. Check your answers with those in the back of the book. Do sets in the "related practice examples" on pages 45 to 47 which correspond to the questions you missed in the Diagnostic Test (for example, if you missed question 3, do set 3 as an exercise). Then write Diagnostic Test B on page 47 (odd numbers only) and check your answers. Do sets in the "related practice examples" on pages 47-49 which correspond to the questions you missed in the Diagnostic Test.

Information for objective 6 is found on pages 73 and 74 of Basic Mathematics. Do any five problems on pages 74 and 75 and check your answers. Do several other problems from pages 74 and 75 if you have made some errors in your first five problems.

If your work is correct to this stage, you are ready to write Item Progress Check ID, Form 1. If you need further assistance, use one or more of the following:

Objective	Source Materials	Page(s)	Content
3	Basic Mathematics	51,52	information
1,2,3	"	55-58	information & exercises
1,2	"	62-64	"
5	"	64-69	"
1,2,4,5	Mathematics, A Basic Course	13-15	"
6	"	16	problems
1	Learning to Compute	10-15	exercises
5	"	16	"
6	"	11,13,15 16,18	problems
6	Refresher Mathematics	50,51	"
1,2,3,4	General Mathematics	29-33	information & exercises

After you have written Item Progress Check ID, Form 1, and have met the criterion, go on to the next item as indicated on your Diagnosis. If you do not meet the criterion, select additional work from the table on the last page, and, after completing it, write Item Progress Check ID, Form 2. If you now meet the criterion, go on to the next Item shown on your Diagnosis. If not, see your instructor.

If you have now completed all the work in Unit I, you are ready to write Unit I Progress Test, Form 1. If you meet the criterion, do Diagnosis II. If not, see your instructor.

Mathematics Item Progress Check

UNIT I: WHOLE NUMBERS Name: _____

ITEM D: MULTIPLICATION Date: _____

Form 1

Criterion: 19/19
Score: ___/___

(3) 1. a. Five times four is _____.

b. Seven three's are _____.

c. The product of 4 and 2 is _____.

(1) 2. Write "six times four is twenty-four" in symbols.

_____

(1) 3. Rewrite 4 x 2 = 8 as addition. _____

(5) 4. Do these.

a. 6 x 3 = _____ d. 5 x 1 = _____

b. 3 x 6 = _____ e. 9 x 6 = _____

c. 4 x 0 = _____

(5) 5. Multiply and show your work here.

a. $\begin{array}{r} 42 \\ \underline{2} \end{array}$ b. $\begin{array}{r} 69 \\ \underline{3} \end{array}$ c. $\begin{array}{r} 407 \\ \underline{24} \end{array}$ d. $\begin{array}{r} 2005 \\ \underline{100} \end{array}$ e. 27 x 13 = _____

Problems: In the space below, show the work you do to solve problems. One mark is for your work, and one mark is for the correct answer.

(2) 6. Three buses each with 48 passengers were used on a field trip. How many people went on the trip?

(2) 7. If your reading rate is 210 words per minute, how many words can you read in 5 minutes?

Mathematics Item Progress Check

UNIT I: WHOLE NUMBERS Name: _____

ITEM D: MULTIPLICATION Date: _____

Form 2

Criterion:	18 /19
Score:	___/___

(3) 1. a. Seven times four is _____.

b. Eight seven's are _____.

c. The product of 11 and 7 is _____.

(1) 2. Write "thirty-three times four equals one hundred thirty-two" in symbols.

_____

(1) 3. Rewrite 9 x 6 = 54 as addition _____

(5) 4. Do these.

a. 4 x 5 = _____ d. 90 x 0 = _____

b. 5 x 4 = _____ e. 42 x 1 = _____

c. 9 x 8 = _____

(5) 5. Multiply and show your work here.

a. $\begin{array}{r} 21 \\ \underline{3} \end{array}$ b. $\begin{array}{r} 28 \\ \underline{4} \end{array}$ c. $\begin{array}{r} 260 \\ \underline{23} \end{array}$ d. $\begin{array}{r} 479 \\ \underline{10} \end{array}$ e. 81 x 14 =

_____

Problems: In the space below, show the work you do to solve problems. One mark is for your work, and one mark is for the correct answer.

(2) 6. A machine will make 800 bolts in an hour. How many bolts would it make in 6 hours?

(2) 7. If you go 17 miles on each gallon of gas, how far can you go on 20 gallons?

MATHEMATICS

UNIT I: WHOLE NUMBERS

ITEM E: DIVISION

OBJECTIVES

The student must be able to:

1. Perform division given instructions such as:

   $\overline{}$ 6 divided by 3 is 2.

   3 into 6 goes 2 times.

   3 into 6 is 2.

   The quotient of 6 divided by 3 is 2.

2. Write sentences using the symbols "÷" and "=" and in the form "$\overline{}$".

3. Perform division using 0 and 1 as in the cases:

   $6 \div 1 = 6$

   $0 \div 6 = 0$

4. Perform division of large numbers including cases where there are remainders.

5. Use division in solving word problems.

LEARNING RESOURCES

Books: Basic Mathematics, Bouman and Lindsay
General Mathematics, Ginn and Company
Learning to Compute, Harcourt, Brace & World Inc.
Mathematics, A Basic Course, Cambridge Book Company
Refresher Mathematics, Stein

LEARNING ACTIVITIES

If you missed any of objectives 1 to 4 on the Diagnosis, get a copy of Refresher Mathematics and read pages 52 and 53. Then write Diagnostic Test A on page 54, doing only the odd numbered questions. Check your answers with those in the back of the book. Do sets in the "related practice examples" on pages 55 to 57, which correspond to the questions you missed in the Diagnostic Test (for example, if you missed question 3, do set 3 as an exercise). Then write Diagnostic Test B on page 57 (odd numbers only) and check your answers. Do sets in the "related practice examples" on pages 57 to 60 which correspond to the questions you missed in the Diagnostic Test.

Information for objective 5 is found on page 127, question 1 of Basic Mathematics. Do any five problems on pages 127 and 128 and check your answers. Do several other problems from pages 127 and 128 if you have made some errors in your first five problems.

If your work is correct to this stage, you are ready to write Item Progress Check IE, Form 1. If you need further assistance, use one or more of the following:

Objective	Source Materials	Page(s)	Content
1,2	Basic Mathematics	113-119	information & exercises
4	"	119-122	"
1	Learning to Compute	24-27	exercises
4	"	30,31	"
5	"	27,29,31	problems
1,2,4	Mathematics, A Basic Course	16-19	information & exercises
1,2,3	General Mathematics	34-36	"

After you have written Item Progress Check IE, Form 1, and have met the criterion, go on to the next Item as indicated on your Diagnosis. If you do not meet the criterion, select additional work from the above table and, after completing it, write Item Progress Check IE, Form 2. If you now meet the criterion, go on to the next Item shown on your Diagnosis. If not, see your instructor.

If you have now completed all the work in Unit I, you are ready to write Unit I Progress Test, Form 1. If you meet the criterion, do Diagnosis II. If not, see your instructor.

Mathematics Item Progress Check

UNIT I: WHOLE NUMBERS Name: _____

ITEM E: DIVISION Date: _____

Form 1

Criterion: 19 / 19
Score: ___/___

(3) 1. a. Ten divided by two is _____.

b. 5 into 20 goes _____ times.

c. The quotient of 30 divided by 6 is _____.

(1) 2. Write "forty divided by eight equals five" in two ways using symbols.

_____

_____

(6) 3. Do these.

a. $8 \div 2 =$ _____ d. $100 \div 10 =$ _____

b. $0 \div 4 =$ _____ e. $81 \div 3 =$ _____

c. $42 \div 1 =$ _____ f. $27 \div 3 =$ _____

(5) 4. Divide and show your work here.

a. $6\overline{)96}$ b. $9\overline{)243}$ c. $40\overline{)205}$ d. $352\overline{)7392}$ e. $299 \div 13 =$

_____

Problems: In the space below, show the work you do to solve problems. One mark is for your work, and one mark is for the correct answer.

(2) 5. If you got a job with a yearly salary of 4,800 dollars, how much would you earn each month?

(2) 6. If a case of 48 books weighs 144 pounds, how much does each book weigh?

Mathematics Item Progress Check

UNIT I: WHOLE NUMBERS Name: _____

ITEM E: DIVISION Date: _____

Form 2

Criterion: 18 /19
Score: ___/___

(3) 1. a. Nine divided by three is _____

b. 4 into 20 is _____.

c. The quotient of 21 divided by 7 is _____.

(1) 2. Write "twenty-four divided by six equals four" in two ways using symbols.

_____

_____

(6) 3. Do these.

a. 16 ÷ 4 = _____ d. 1000 ÷ 100 = _____

b. 0 ÷ 2 = _____ e. 72 ÷ 3 = _____

c. 32 ÷ 1 = _____ f. 40 ÷ 5 = _____

(5) 4. Divide and show your work here.

a. 6 /66 b. 8 /176 c. 30 /965 d. 465 /11,160

e. 360 ÷ 12 = _____

Problems: In the space below, show the work you do to solve problems. One mark is for your work, and one mark is for the correct answer.

(2) 5. A city divides a mile (5,280 ft.) into 16 equal blocks. How long is each block (in feet)?

(2) 6. A painter used 96 gallons of paint to paint the outside of 25 houses. How much did he use on each house to the nearest gallon?

MATHEMATICS

UNIT I: WHOLE NUMBERS

ITEM F: PROBLEM SOLVING

OBJECTIVES

The student must be able to:

1. State the steps in solving a number problem - that is:
   a. Write what is to be found
   b. Write a word sentence using given facts and telling what is to be found
   c. Write a mathematical sentence in symbols using given facts and telling what is to be found
   d. Solve the mathematical sentence.(calculate what is not known)
   e. Write the answer to the original problem
2. Apply each or all of the above in solving a given problem.

LEARNING RESOURCES

Books: Basic Mathematics, Bouman and Lindsay
General Mathematics, Ginn and Company
Learning to Compute, Harcourt, Brace & World Inc.
Mathematics, A Basic Course, Cambridge Book Company
Refresher Mathematics, Stein

LEARNING ACTIVITIES

If you missed either objective 1 or 2 on the Diagnosis, get a copy of Basic Mathematics, and read about "Problems" on page 44. Then read over Objective 1 on this sheet. Do any four problems on page 45 (these are problems in addition). Check your answers. Now turn to page 103, read the top of the page,

and answer any four of these subtraction problems. Check your answers. Read about "problems" on pages 73 and 74, and do any four multiplication problems on pages 74 and 75. Check your answers. Finally, work any four division questions from pages 127 and 128 and check your answers. Do several other problems from any page on which you have made errors.

If your work is correct to this stage, you are ready to write Item Progress Check IF, Form 1. If you need further assistance, use one or more of the following:

Objective	Source Materials	Page(s)	Content
2	Learning to Compute	2,4,5,8	addition problems
2	"	23,24	subtraction "
2	"	11,13,15, 16,18	multiplication "
2	"	27,29,31	division problems
2	Refresher Mathematics	32,33	addition "
2	"	40,41	subtraction "
2	"	50,51	multiplication "
2	Mathematics, A Basic Course	9	addition "
2	"	11,12	subtraction "
2	"	16	multiplication "
2	"	18,19	division "

After you have written Item Progress Check IF, Form 1, and have met the criterion, you are ready to write Unit I Progress Test, Form 1. If you meet the criterion on Unit I Progress Test, you are ready to do Diagnosis II. If not, see your instructor.

If you do not meet the criterion on Item Progress Check IF, Form 1, select additional work from the above table and, after completing it, write Item Progress Check IF, Form 2. If you do not meet the criterion, see your instructor.

If you now meet the criterion, you are ready to write Unit I Progress Test, Form 1. If you meet the criterion on the Unit Test, do Diagnosis II. If not, see your instructor.

Mathematics Item Progress Check

UNIT I: WHOLE NUMBERS Name: _____

ITEM F: PROBLEM SOLVING Date: _____

Form 1

Criterion:	10/10
Score:	___/___

Problems:- In the space below, show the work you do to solve problems. One mark is for your work, and one mark is for the correct answer.

(2) 1. A store sold 15 refrigerators at $298.00 each. How much money did they collect from the sale?

(2) 2. Mr. Jones is buying a house for $18,500. He makes a cash payment of $4,950. What is the amount still to be paid?

(2) 3. Jim shot 5 ducks, 3 geese, 4 pheasants, and 2 grouse. What was the total number of birds taken home?

(2) 4. A herd of cattle is to be divided equally between seven cowboys. How many cows would each receive if there were 1029 in the herd?

(2) 5. Mr. Johnson can buy an automobile for $2,150.00 cash, or $400.00 down and $80.00 a month for 24 months. How much can he save by paying cash?

Mathematics Item Progress Check

UNIT I: WHOLE NUMBERS Name: _____

ITEM F: PROBLEM SOLVING Date: _____

Form 2

Criterion:	9 /10
Score:	___/___

Problems: In the space below, show the work you do to solve problems. One mark is for your work, and one mark is for the correct answer.

(2) 1. George has a stamp collection containing 127 stamps from Great Britain, 47 from Germany and 62 from France. How many stamps does he have?

(2) 2. Sarah's stamp collection contains 526 stamps. Bill's stamp collection contains 307 stamps. How many more stamps does she have than Bill?

(2) 3. If Mary buys 23 packages of stamps, each package containing 28 stamps, how many stamps did she buy?

(2) 4. At a recent collectors meeting, Tom gave away his stamp collection. He gave an equal number to each of the 37 members in the club. The number of stamps he started with was 5472. How many did each person get - and how many was Tom left with (remainder)?

(2) 5. In the Franklin High School there are 5 classes with 39 students on roll, 13 classes with 38 students, and 12 classes with 37 students. Find the total enrollment of the schools.

Mathematics Unit Progress Test

UNIT I: WHOLE NUMBERS Name: _____

Form 1 Date: _____

Criterion: 39 / 42
Score: ___/___

(1) 1. Count the letters in this sentence and write the answer at the right. _____

(3) 2. Write the following in numerals.

a. seventeen _____

b. sixty-six _____

c. four hundred thousand _____

(5) 3. Name the place value of the underlined digits.

a. 10<u>6</u>1 _____ d. <u>6</u>421 _____

b. <u>7</u>00,000 _____ e. 9<u>0</u>6 _____

c. 43<u>2</u>1 _____

(1) 4. Arrange the following numbers in order from smallest to largest.

19, 91, 119, 18, _____, _____, _____, _____.

(3) 5. Round off 23,645 to the nearest:

a. ten _____

b. hundred _____

c. thousand _____

(3) 6. Do the following:

a. 5 - 5 = _____ e. 3 ÷ 1 = _____

b. 4 - 0 = _____ f. 6 + 0 = _____

c. 7 x 1 = _____ g. 0 ÷ 2 = _____

d. 3 x 0 = _____ h. 7 x 12 = _____

(3) 7. Write the following in symbols.

a. Eight minus five is three _____

b. Forty-two times two is eighty-four _____

c. Four from five is one _____

(3) 8. Add these and show your work here.

a. 42 b. 209 c. 426 + 2 + 28 =
9 11
_____

(3) 9. Subtract these and show your work here.

a. 31 b. 298 c. 10,000
9 149 249

(3) 10. Multiply these and show your work here.

a. 27 b. 492 c. 6,190
3 204 10

(3) 11. Divide these and <u>show your work</u> here.

a. $24\overline{)312}$ b. $20\overline{)4260}$ c. $9\overline{)3697}$

<u>Problems</u>: In the space below, show the work you do to solve problems. One mark is for your work, and one mark is for the correct answer.

(2) 12. A salesman travelled at 550 miles per hour on a jet for 4 hours, then changed to a slower plane which went 240 miles per hour for 3 hours. How many miles did he go in total?

(2) 13. Four people travel to work in one man's car and share expenses. They each pay 5 dollars per month. At the end of the month they find that the cost of operating the car was 12 dollars. How much would each man get back after the expenses were paid?

(2) 14. You are preparing a report on a hockey league to show games won, lost, tied and points for each of the 6 teams. The information you have is:

Leafs - won, 17; tied 4; lost, 6

Canadians - won; 22; tied, 2; lost, 3

Blues - won, 10; tied, 8; lost, 9

Bruins - won, 21; tied, 5; lost, 1

Rangers - won, 14; tied, 9; lost, 4

Canucks - won, 16; tied, 7; lost, 4

Fill in this table to show the above information and the order the teams stand in points earned at 2 points for each win and 1 point for a tie.

Team	Won	Tied	Lost	Games Played	Points
1. Bruins					
2. Canadians					
3. Canucks					
4. Leafs					
5. Rangers					
6. Blues					

Mathematics Unit Progress Test

UNIT I: WHOLE NUMBERS

Name: _____

Form 2

Date: _____

Criterion:	38 /42
Score:	___/___

(1) 1. How many letters are in the box? _____

Q	A	Z	W	S	X	E	D	C	V	F	R	T	G	B	Y	H	N	U	J	M	U	M

(3) 2. Write the following in numerals.

a. sixteen _____

b. two hundred five _____

c. fourteen thousand three hundred forty-two _____

(5) 3. Name the place value of the "5" in each of these.

a. 265 _____ d. 22,542 _____

b. 5,422 _____ e. 10,452 _____

c. 15,423,697 _____

(1) 4. Arrange these numbers in order from <u>largest</u> to <u>smallest</u>.

7419, 7320, 8318, 7277 _____, _____, _____, _____.

(3) 5. Round off 4,356 to the nearest:

a. ten _____

b. hundred _____

c. thousand _____

(8) 6. Do the following.

a. $10 \div 1 =$ _____ e. $0 \div 7 =$ _____

b. $6 + 0 =$ _____ f. $1 \times 9 =$ _____

c. $9 \times 6 =$ _____ g. $7 - 7 =$ _____

d. $0 \times 4 =$ _____ h. $14 - 0 =$ _____

(3) 7. Write the following in symbols.

a. Four three's are twelve. _____

b. Seven minus three is four. _____

c. Eight plus nine is seventeen. _____

(3) 8. Add these and show your work here.

a. $\begin{array}{r} 33 \\ +\ 8 \end{array}$ b. $\begin{array}{r} 402 \\ +\ 18 \end{array}$ c. $336 + 4{,}260 + 91 =$ _____

(3) 9. Subtract these and show your work here.

a. $\begin{array}{r} 46 \\ -\ 19 \end{array}$ b. $\begin{array}{r} 706 \\ -\ 46 \end{array}$ c. $4{,}084 - 377 =$ _____

(3) 10. Multiply these and show your work here.

a. $\begin{array}{r} 467 \\ \times\ 80 \end{array}$ b. $\begin{array}{r} 340 \\ \times\ 469 \end{array}$ c. $555 \times 10 =$ _____

(3) 11. Divide these and <u>show your work</u> here.

a. $9\overline{)621}$ b. $18\overline{)366}$ c. $40\overline{)1,280}$

<u>Problems:</u> In the space below, show the work you do to solve problems. One mark is for your work, and one mark is for the correct answer.

(2) 12. A secretary earned 15 dollars a day for 5 days. Out of her salary she had to pay 6 dollars for her bus tickets and cab fare. How much did she have left?

(2) 13. A car pulled a camper trailer for 160 miles and got 10 miles per gallon of gas. It then went another 36 miles without the trailer and got 18 miles per gallon. How many gallons of gas did the car use for both trips together?

(2) 14. A certain computer can make 10,000 calculations per second. How long will it take to do three jobs of 10,000 calculations, 20,000 calculations and 40,000 calculations if it takes 10 seconds to load the machine for each job?

Mathematics Diagnosis

UNIT II: FRACTIONS

NAME: _____

DATE: _____

1. $\frac{3}{4}$ means _____ A-1

2. In $\frac{2}{3}$ the numerator is the _____ A-2

3. In the following check the one which has a value of 1. A-3

   a. $\frac{3}{4}$ _____, b. $\frac{5}{5}$ _____, c. $\frac{7}{6}$ _____.

4. Match by placing the correct fraction from the left in the space at the right. A-4

   a. $\frac{2}{5}$ _____ mixed number

   b. $1\frac{1}{4}$ _____ improper fraction

   c. $\frac{4}{3}$ _____ common fraction

5. Write the following fractions in their simplest form. A-5

   a. $\frac{6}{8}$ _____, b. $\frac{2}{4}$ _____, c. $\frac{15}{18}$ _____.

6. Write $\frac{13}{8}$ as a mixed number. _____ A-6

7. Write $2\frac{7}{9}$ as an improper fraction. _____ A-6

8. Write a fraction which is equal to $\frac{5}{6}$ but has a denominator of 24. _____ A-7

9. Write these fractions with a common denominator: A-8

   $\frac{1}{3}$, $\frac{2}{5}$, $\frac{3}{10}$ _____

10. Arrange the following in order from smallest to largest. A-9

$\frac{3}{4}, \frac{5}{6}, \frac{2}{3}, 1\frac{1}{3}$ _____, _____, _____, _____.

11. Find the sum in each of the following.

a. $\frac{3}{4} + \frac{1}{4} =$ _____ B-1

b. $\frac{1}{6} + \frac{4}{6} =$ _____ B-1

c. $\frac{7}{16} + \frac{3}{16} =$ _____ B-1

d. $\frac{3}{4} + \frac{5}{8} =$ _____ B-2

e. $\frac{4}{5} + \frac{1}{10} + \frac{3}{20} =$ _____ B-2

f. $\frac{1}{13} + \frac{5}{7} =$ _____ B-2

g. $5\frac{1}{6} + 4\frac{5}{6} =$ _____ B-3

h. $7\frac{1}{4} + 2 + 9\frac{1}{6} =$ _____ B-3

12. A taxi made trips of 3 miles, $2\frac{1}{2}$ miles and $\frac{7}{8}$ miles. What was the total distance travelled? Show your work. B-4

13. Find the difference in each of the following.

a. $\frac{3}{4} - \frac{1}{4} =$ _____ C-1

b. $\frac{7}{16} - \frac{6}{16} =$ _____ C-1

c. $\frac{5}{8} - \frac{3}{16} =$ _____ C-2

d. $5\frac{7}{10} - 2\frac{1}{10} =$ _____ C-3

e. $13\frac{1}{6} - 7\frac{5}{6} =$ _____ C-3

f. $5\frac{2}{3} - 3\frac{7}{8} =$ _____ C-3

14. If you got a ride for only $1\frac{2}{3}$ miles of a $2\frac{1}{2}$ mile trip how far did you have to walk? Show your work. C-5

15. Circle all the sentences that mean "multiply". D-1

$\frac{1}{3} \times \frac{1}{2}$, $\frac{1}{3} = \frac{1}{3}$, $\frac{1}{3}$ of $\frac{1}{2}$, $\frac{1}{3}$ is $\frac{1}{2}$.

16. Find the product of each of the following.

a. $14 \times \frac{5}{28} =$ _____ D-2

b. $\frac{2}{3} \times \frac{4}{5} =$ _____ D-3

c. $\frac{1}{4} \times \frac{3}{4} =$ _____ D-4

d. $3\frac{1}{4} \times 7 =$ _____ D-4

e. $4\frac{1}{5} \times 4\frac{2}{7} =$ _____ D-5

f. $4\frac{4}{9} \times \frac{1}{2} =$ _____ D-6

g. $4 \times 2\frac{1}{2} \times \frac{1}{3} =$ _____ D-7

17. If $18\frac{1}{2}$ gallons of gas were in a car and $\frac{2}{3}$ of this was used. How many gallons were used? Show your work.

D-8

18. Find the quotients in each of the following:

a. $\frac{3}{4} \div 2 =$ _____

E-1

b. $3 \div \frac{3}{1} =$ _____

E-2

c. $\frac{3}{7} \div \frac{3}{55} =$ _____

E-3

d. $\frac{9}{16} \div \frac{1}{2} =$ _____

E-3

e. $5\frac{1}{2} \div 2 =$ _____

E-4

f. $4\frac{1}{8} \div 2\frac{1}{2} =$ _____

E-5

g. $48 \div \frac{3}{5} =$ _____ E-2

19. A box contained 40 pounds of books. If each book weighs $1\frac{1}{3}$ pounds, how many books were in the box? Show your work. E-6

20. Eight yards of cloth were bought. If 3 shirts were made and $2\frac{1}{4}$ yards were used for each, how much would be left? Show your work. D-8 C-5 F-2

MATHEMATICS

UNIT II: FRACTIONS

ITEM A : READING AND WRITING

OBJECTIVES

The student must be able to:

1. Define a given fraction (i.e., $\frac{5}{8}$ means 5 parts of 8 equal parts).
2. Identify numerator and denominator in a given fraction.
3. Identify fractions of the form $\frac{2}{2}$, $\frac{3}{3}$, etc. as being equal to 1.
4. Identify common fractions. improper fractions and mixed numbers.
5. Reduce a fraction to its lowest or simplest form.
6. Change improper fractions to mixed numbers and mixed numbers to improper fractions.
7. Write equivalent fractions for a given fraction given a new numerator or denominator.
8. Write a set of fractions with a common denominator.
9. Arrange a set of fractions in a given order by comparing numerators after writing the set with a common denominator.

NOTE: Common fractions and proper fractions are the same.

All answers to be given in simplest form.
Change improper fractions to mixed numbers.

LEARNING RESOURCES

Books: Basic Mathematics, Bouman and Lindsay
General Mathematics, Ginn and Company
Mathematics, A Basic Course, Cambridge Book Company
Refresher Mathematics, Stein
Learning to Compute, Harcourt, Brace & World Inc.

Tapes: Introduction to Fraction Concepts, Math. Mastery Tapes

LEARNING ACTIVITIES

If you missed any of objectives 1,2, or 3 on the Diagnosis, get a copy of Mathematics, A Basic Course and read pages 25 and 26. Then do the exercises on pages 27 and 28. Check your answers with those in the separate answer key.'

If you missed objective 4, read "Types of Fractions" on page 28 and 29, and do the exercises on page 29.

If you missed objective 5, read "How to Work with Fractions" on pages 29 to 31 and do the exercises on page 32. (#1 a-l & #2 a-l)

If you missed either objective 6 or 7, read about changing fractions on pages 32 to 34 and do the exercises on pages 34 and 35. (#1 a-l, #2 a-j, #3 a-j)

If you missed any of objectives 7, 8, or 9, read "Comparing Fractions" on pages 45 to 47. Then do exercises 1 to 4 on page 47.

Check your answers to any of these sections with the separate answer key. If your work is correct to this stage, you are ready to write Item Progress Check II A, Form 1. If you need further assistance, use one or more of the following:

Objective	Source Materials	Page(s)	Content
1,2	Math. Mastery Tapes	Tape 2	introduction to fraction concepts
1,2,3	"	" 3	"
7,9	"	" 4	"
7	"	" 5	"
5	"	" 6	"
4,6,9	"	" 7	"
6	"	" 8	"
1,2,3	Basic Mathematics	135,136	information & exercises
5,7	"	147,148	"
1,2	Learning to Compute	33	"
7	"	34,35	"
5	"	36	"
6	"	38,39	"
5	Refresher Mathematics	89,90	"
4,6	"	91-94, 116 117	"
7	"	95,96	"
9	"	114,115	"
1	General Mathematics	54,55	information
2	"	55	"
3	"	68	"
4	"	55,61	"
5	"	57-59	"
7	"	56-57	"

After you have written Item Progress Check IIA, Form 1, and have met the criterion, go on to the next Item as indicated on your Diagnosis. If you do not meet the criterion, select additional work from the above table and, after completing it, write Item Progress Check II A, Form 2. If you now meet the criterion, go on to the next Item shown on your Diagnosis. If not, see your instructor.

If you have now completed all the work in Unit II, you are ready to write Unit II Progress Test, Form 1. If you meet the criterion, do Diagnosis III. If not, see your instructor.

Mathematics Item Progress Check

UNIT II: FRACTIONS Name: _____

ITEM A : READING AND WRITING Date: _____

Form 1

Criterion: 14 /14
Score: ___/___

(1) 1. What does $\frac{2}{3}$ mean? _____

(1) 2. In $\frac{2}{3}$ the numerator is _____

(3) 3. Match by writing the fraction on the left with its name on the right.

a. $\frac{2}{3}$ 1.____ mixed number

b. $1\frac{2}{3}$ 2.____ common fraction

c. $\frac{3}{2}$ 3.____ improper fraction

(3) 4. Write in simplest form.

a. $\frac{4}{4}$ ____, b. $\frac{16}{8}$ ____, c. $\frac{20}{25}$ ____.

(1) 5. Write $\frac{7}{3}$ as a mixed number. _____

(1) 6. Write $9\frac{3}{5}$ as an improper fraction. _____

(3) 7. Put the correct number in the ( ).

a. $\frac{3}{4} = \frac{(\quad)}{12}$ b. $\frac{5}{3} = \frac{15}{(\quad)}$ c. $\frac{6}{6} = \frac{(\quad)}{108}$

(1) 8. Which is the larger number: $\frac{2}{3}$ OR $\frac{4}{7}$? _____

Mathematics Item Progress Check

UNIT II: FRACTIONS Name: _____

ITEM A : READING AND WRITING Date: _____

Form 2

Criterion:	12/14
Score:	___/___

(1) 1. Write a symbol which represents 4 parts of 7 equal parts.

_____

(1) 2. In $\frac{5}{18}$ the denominator is _____.

(3) 3. Name these as being a common fraction, an improper fraction, or a mixed number.

a. $\frac{5}{16}$ _____

b. $\frac{9}{8}$ _____

c. $17\frac{1}{5}$ _____

(3) 4. Write in simplest form.

a. $\frac{25}{35}$ ____, b. $\frac{21}{7}$ ____, c. $\frac{13}{13}$ ____.

(1) 5. Write $\frac{28}{27}$ as a mixed number. _____

(1) 6. Write $12\frac{2}{3}$ as an improper fraction. _____

(3) 7. Write 3 equivalent fractions for $\frac{2}{3}$.

_____ _____ _____

(1) 8. Which is the smaller number: $\frac{5}{6}$ or $\frac{7}{8}$? _____

MATHEMATICS

UNIT II: FRACTIONS

ITEM B : ADDITION

OBJECTIVES

The student must be able to:

1. Calculate the sum of a given pair of fractions with common denominators.
2. Calculate the sum of fractions with different denominators.
3. Calculate the sum of mixed numbers with like and unlike denominators.
4. Use addition of fractions in solving word problems.

NOTE: All answers to be given in simplest form. Change improper fractions to mixed numbers.

LEARNING RESOURCES

Books: Basic Mathematics, Bouman and Lindsay
General Mathematics, Ginn and Company
Mathematics, A Basic Course, Cambridge Book Company
Refresher Mathematics, Stein
Learning to Compute, Harcourt, Brace & World, Inc.

Tapes: Fractional Number Computation, Math. Mastery Tapes

LEARNING ACTIVITIES

If you missed any of objectives 1,2, or 3 on the Diagnosis, get a copy of Refresher Mathematics and read pages 100 and 101. Then write the Diagnostic Test on page 101 doing only the odd numbered questions. Check your answers with those in the back of the book. Do sets in the "related practice examples" on page 101 to 104 which correspond to the questions you missed in the Diagnostic Test (for example, if you missed question 3, do set 3 as an exercise).

Problems for objective 4 are found on page 104. Do 1,3,5 and 7. Check your answers with those in the back of the book.

If your work is correct to this stage, you are ready to write Item Progress Check IIB, Form 1. If you need further assistance, use one or more of the following:

Objective	Source Materials	Page(s)	Content
1	Math. Mastery Tapes	tape 1	Fractional Number Computation
2	"	" 2	"
2	"	" 3	" (use tape 2 first)
3	"	" 4	Fractional Number Computation
1,2	Basic Mathematics	143-149	information & exercises
3	"	150-151	"
1,2,3	Learning to Compute	41-47	"
4	"	47	problems
1	Mathematics, A Basic Course	36,37	information & exercises
2, 3	"	38-40	"
1,2,3	General Mathematics	60-68	"

After you have written Item Progress Check IIB, Form 1, and have met the criterion, go on to the next Item as indicated on your Diagnosis. If you do not meet the criterion, select additional work from the above table and, after completing it, write Item Progress Check II B, Form 2. If you now meet the criterion, go on to the next Item shown on your Diagnosis. If not, see your instructor.

If you have now completed all the work in Unit II, you are now ready to write Unit II Progress Test, Form 1. If you meet the criterion, do Diagnosis III. If not, see your instructor.

Mathematics Item Progress Check

UNIT II: FRACTIONS Name: _____

ITEM B : ADDITION Date: _____

Form 1

Criterion: 10 /10
Score: ___/___

(8) 1. Add these and write the answers in simplest form.

a. $\frac{2}{5} + \frac{3}{5} =$ _____

b. $\frac{1}{2} + \frac{7}{8} =$ _____

c. $2\frac{1}{4} + \frac{4}{5} =$ _____

d. $\frac{11}{3} + \frac{7}{3} + \frac{1}{3} =$ _____

e. $3\frac{3}{4} + 1\frac{2}{3} =$ _____

f. $2\frac{5}{8}$ g. $3\frac{4}{5}$ h. $42\frac{1}{5}$

$1\frac{5}{6}$ 1 $7\frac{4}{5}$

_____ _____ _____

Problems: In the space below, show the work you do to solve problems. One mark is for your work, and one mark is for the correct answer.

(2) 2. Find the number of hours worked in the week for a person who worked $7\frac{1}{4}$ hours on Monday, $6\frac{1}{2}$ hours on Tuesday, $3\frac{1}{2}$ hours on Wednesday, $8\frac{1}{4}$ hours on Thursday, and $7\frac{1}{4}$ hours on Friday.

Mathematics Item Progress Check

UNIT II: FRACTIONS Name: _____

ITEM B: ADDITION Date: _____

Form 2

Criterion:	9 / 10
Score:	___/___

(8) 1. Add these and write the answers in simplest form.

a. $\frac{3}{4} + \frac{3}{4} =$ _____

b. $\frac{5}{6} + \frac{1}{4} =$ _____

c. $\frac{10}{3} + \frac{7}{6} =$ _____

d. $2\frac{4}{5} + 1\frac{7}{8} =$ _____

e. $4\frac{1}{9} + \frac{1}{6} =$ _____

f. $3\frac{4}{7}$ + $1\frac{2}{3}$ = _____

g. $5\frac{1}{6}$ + 1 = _____

h. $56\frac{1}{8}$ + $43\frac{7}{8}$ = _____

Problems: In the space below, show the work you do to solve problems. One mark is for your work, and one mark is for the correct answer.

(2) 2. A taxi made trips of $3\frac{1}{2}$ miles, $2\frac{1}{4}$ miles, $1\frac{1}{6}$ miles, and $8\frac{3}{4}$ miles during an evening shift. How far did the taxi travel all together?

MATHEMATICS

UNIT II: FRACTIONS

ITEM C: SUBTRACTION

OBJECTIVES

The student must be able to:

1. Calculate the difference of a pair of fractions with common denominators.
2. Calculate the difference of a given pair of fractions with different denominators.
3. Calculate the difference of two mixed numbers which have common or like denominators including cases where borrowing is required.
4. Calculate the difference of two mixed numbers which have unlike denominators including cases where borrowing is required.
5. Use subtraction of fractions in solving word problems.

NOTE: All answers to be given in simplest form. Change improper fractions to mixed numbers.

LEARNING RESOURCES

Books: Basic Mathematics, Bouman and Lindsay
General Mathematics, Ginn and Company
Mathematics, A Basic Course, Cambridge Book Company
Refresher Mathematics, Stein
Learning to Compute, Harcourt, Brace and World Inc.

Tapes: Fractional Number Computation, Math. Mastery Tapes

LEARNING ACTIVITIES

If you missed any of objectives 1,2,3 or 4 on the Diagnosis, get a copy of Refresher Mathematics and read page 106. Then do the Diagnostic Test at the top of page 107, doing only questions 1 and 3. Check your answers with those in the back of the book. Do sets in the "related practice examples" on page 107 which correspond to the questions you missed in the Diagnostic Test. (For example, if you missed question 3, do set 3 as an exercise). Then read pages 108 and 109 and do the Diagnostic Test on page 109. (odd numbers only) Check your answers and do the necessary sets on pages 109 to 112 which correspond to your errors in the Diagnostic Test.

Problems for objective 5 are found on page 112. Do 1,3,5 and 7. Check your answers with those in the back of the book.

If your work is correct to this stage, you are ready to write Item Progress Check II C, Form 1. If you need further assistance, use one or more of the following:

Objective	Source Materials	Page(s)	Content
1	Math. Mastery Tapes	tape 1	Fractional Number Computation
2	"	" 2	"
2	"	" 3 (use tape 2 first)	"
3,4	"	" 4	Fractional Number Computation
3	"	" 5	"
3	"	" 6	"
4	"	" 7	"
3,4	Basic Mathematics	151-155	information & excercises
1,2,3,4	Learning to Compute	49-51	"
5	"	51	problems
1,3	Mathematics, A Basic Course	40-42	information & excercises
2,4	"	42-44	"
1,2,3,4	General Mathematics	60-64	"

After you have written Item Progress Check II C, Form 1, and have met the criterion, go on to the next Item as indicated on your Diagnosis. If you do not meet the criterion, select additional work from the table on the opposite page; after completing it, write Item Progress Check II C, Form 2. If you now meet the criterion, go on to the next Item shown on your Diagnosis. If not, see your instructor.

If you have now completed all the work in Unit II, you are now ready to write Unit II Progress Test, Form 1. If you meet the criterion, do Diagnosis III. If not, see your instructor.

Mathematics Item Progress Check

UNIT II: FRACTIONS Name: _____

ITEM C : SUBTRACTION Date: _____

Form 1

Criterion:	10 /10
Score:	___/___

(8) 1. Subtract these and write the answers in simplest form.

a. $\frac{4}{7} - \frac{2}{7} =$ _____

b. $\frac{5}{6} - \frac{3}{4} =$ _____

c. $5\frac{7}{8} - \frac{3}{4} =$ _____

d. $4\frac{1}{3} - \frac{2}{3} =$ _____

e. $3\frac{1}{4} - 2\frac{7}{10} =$ _____

f. $9\frac{3}{4}$ g. $9\frac{5}{6}$ h. $10\frac{4}{7}$

$1\frac{1}{3}$ 2 $1\frac{4}{7}$

Problems: In the space below, show the work you do to solve problems. One mark is for your work, and one mark is for the correct answer.

(2) 2. Six months ago Doreen weighed $129\frac{3}{4}$ pounds. Now she weighs $114\frac{3}{8}$ pounds. How much weight did she lose?

Mathematics Item Progress Check

UNIT II: FRACTIONS Name: _____

ITEM C : SUBTRACTION Date: _____

Form 2

Criterion: 9 /10
Score: __/__

(8) 1. Subtract these and write the answers in simplest form.

a. $\frac{3}{5} - \frac{1}{5} =$ _____

b. $\frac{3}{7} - \frac{1}{3} =$ _____

c. $2\frac{3}{4} - \frac{2}{3} =$ _____

d. $5\frac{1}{6} - \frac{5}{6} =$ _____

e. $2\frac{5}{8} - 1\frac{5}{6} =$ _____

f. $12\frac{3}{8}$ g. $6\frac{3}{10}$ h. $14\frac{1}{8}$

$7\frac{7}{8}$ 5 $4\frac{1}{8}$

Problems: In the space below, show the work you do to solve problems. One mark is for your work, and one mark is for the correct answer.

(2) 2. On a trip, John filled his car with 20 gallons of gasoline. On arrival at his destination $15\frac{5}{8}$ gallons of gasoline were required to fill the tank again. How much was left in the tank before it was refilled?

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MATHEMATICS

UNIT II: FRACTIONS

ITEM D : MULTIPLICATION

OBJECTIVES

The student must be able to:

1. Identify the terms "times" and "of" as meaning "multiply".
2. Calculate the product of a common fraction and a whole number.
3. Calculate the product of a pair of common fractions.
4. Calculate the product of a mixed number and a whole number.
5. Calculate the product of a pair of mixed numbers.
6. Calculate the product of a common fraction and a mixed number.
7. Calculate the product of a set of numbers including whole numbers, common fractions, mixed numbers and improper fractions.
8. Use multiplication of fractions in solving word problems.

NOTE: All answers to be given in simplest form. Change improper fractions to mixed numbers.

LEARNING RESOURCES

Books: Basic Mathematics, Bouman and Lindsay
General Mathematics, Ginn and Company
Mathematics, A Basic Course, Cambridge Book Company
Refresher Mathematics, Stein
Learning to Compute, Harcourt, Brace and World Inc.

Tapes: Fractional Number Computation, Math Mastery Tapes

LEARNING ACTIVITIES

If you missed any of objectives 1 to 7 on the Diagnosis, get a copy of Refresher Mathematics and read pages 118 to 120. Then do the Diagnostic Test on page 120, doing only the odd numbered questions. Check your answers with those in the back of the book. Do sets in the "related practice examples" on pages 121 to 123 which correspond to the questions you missed in the Diagnostic Test. (for example, if you missed question 3, do set 3 as an exercise).

Problems for objective 8 are found in the book Mathematics, A Basic Course. Do problmes 1 and 2 on page 55, and problems 3,6, and 9 on page 56. Check your answers with the separate answer key.

If your work is correct to this stage, you are ready to write Item Progress Check II D, Form 1. If you need further assistance, use one or more of the following:

Objective	Source Materials	Page(s)	Content
1,3	Math Mastery Tapes	tape 8	Fractional Number Computation
2	"	" 9	"
4,5,6	"	" 10	"
4	"	" 11	"
1,2	Basic Mathematics	158-160	information & exercises
4	"	161	"
3	"	163	"
5	"	164	"
2,3	Learning to Compute	53-55	"
4,5,6	"	56,57	"
7	"	57,58	"
8	"	54,58	problems
8	Refresher Mathematics	124	"
2	Mathematics, A Basic Course	48,49	information & exercises
3,7	"	50,51	"
6,7	"	52,53	"
4	"	54	"
1 to 7	General Mathematics	64-68	"

After you have written Item Progress Check II D, Form 1, and have met the criterion, go on to the next Item as indicated on your Diagnosis. If you do not meet the criterion, select additional work from the opposite page and, after completing it, write Item Progress Check II D, Form 2. If you now meet the criterion, go on to the next Item shown in your Diagnosis. If not, see your instructor.

If you have now completed all the work in Unit II, you are now ready to write Unit II Progress Test, Form 1. If you meet the criterion, do Diagnosis III. If not, see your instructor.

Mathematics Item Progress Check

UNIT II: FRACTIONS Name: _____

ITEM D : MULTIPLICATION Date: _____

Form 1

Criterion: 10/10
Score: ___/___

(8) 1. Multiply these and write the answers in simplest form.

a. $4 \times \frac{3}{4} =$ _____

b. $\frac{3}{5} \times \frac{6}{7} =$ _____

c. $2\frac{1}{2} \times 1\frac{3}{4} =$ _____

d. $\frac{6}{5} \times 3\frac{1}{3} =$ _____

e. $\frac{1}{5}$ of 30 is _____

f. $\frac{1}{3}$ of $3\frac{3}{4} =$ _____

g. $5 \times 4\frac{3}{8} =$ _____

h. $3\frac{1}{5} \times 1\frac{1}{4} \times 1\frac{1}{3} =$ _____

Problems: In the space below, show the work you do to solve problems. One mark is for your work, and one mark is for the correct answer.

(2) 2. You buy a record player priced at \$75 and pay $\frac{1}{3}$ of this down and the rest in 5 equal monthly payments. How much are the monthly payments?

Mathematics Item Progress Check

UNIT II: FRACTIONS Name: _____

ITEM D : MULTIPLICATION Date: _____

Form 2

Criterion:	9 /10
Score:	__/__

(8) 1. Multiply these and write the answers in simplest form.

a. $5 \times \frac{2}{3} =$ _____

b. $\frac{3}{7} \times \frac{8}{9} =$ _____

c. $5\frac{1}{2} \times 2\frac{1}{4} =$ _____

d. $\frac{12}{11} \times 2\frac{1}{2} =$ _____

e. $\frac{1}{3}$ of 72 is _____

f. $\frac{1}{6}$ of $\frac{3}{4}$ is _____

g. $7\frac{1}{2} \times 6 =$ _____

h. $2\frac{3}{4} \times 1\frac{1}{8} \times 3\frac{5}{6} =$ _____

Problems: In the space below, show the work you do to solve problems. One mark is for your work, and one mark is for the correct answer.

(2) 2. How many feet of board are needed to make 3 shelves which are each $4\frac{1}{2}$ feet long?

MATHEMATICS

UNIT II: FRACTIONS

ITEM E: DIVISION

OBJECTIVES

The student must be able to:

1. Calculate the quotient when dividing a common fraction by a whole number.
2. Calculate the quotient when dividing a whole number by a common fraction.
3. Calculate the quotient of a pair of common fractions.
4. Calculate the quotient of a mixed number and a whole number.
5. Calculate the quotient of a pair of mixed numbers.
6. Use division of fractions in solving word problems.

NOTE: All answers to be given in simplest form. Change improper fractions to mixed number.

LEARNING RESOURCES

Books: Basic Mathematics, Bouman and Lindsay
General Mathematics, Ginn and Company
Mathematics, A Basic Course, Cambridge Book Company
Refresher Mathematics, Stein
Learning to Compute, Harcourt, Brace and World, Inc.

Tapes: Fractional Number Computation, Math Mastery Tapes

LEARNING ACTIVITIES

If you missed any of objectives 1 to 5 on the Diagnosis, get a copy of Refresher Mathematics and read pages 127 to 129. Then do the Diagnostic Test on page 129, doing only the odd numbered questions. Check your answers with those in the back of the book. Do sets in the "related practice examples" on pages 129 to 132 which correspond to the questions you missed in the Diagnostic Test(for example, if you missed question 3, do set 3 as an exercise).

Problems for objective 6 are found in the book Mathematics, A Basic Course. Do problems 1 to 5 on page 65. Check your answers with those in the separate answer key.

If your work is correct to this stage, you are ready to write Item Progress Check II E, Form 1. If you need further assistance, use one or more of the following:

Objective	Source Materials	Page(s)	Content
3	Math Mastery Tapes	Tape 12	Fractional Number Computation
reciprocals	"	" 13	"
3	"	" 14	*(use tape 13 first)*
1,2,3,4,5	"	" 15	Fractional Number Computation
1,2,3,4,5	Basic Mathematics	165-168	information & exercises
1,2,3,4,5	Learning to Compute	60-62	"
5	"	62-64	problems
6	Refresher Math.	132, 133	"
2	Math., A Basic Course	56-58	information & exercises
3	"	59,60	"
1	"	60,61	"
4	"	61,62	"
1,2,3,4,5	General Mathematics	69-71	"

After you have written Item Progress Check II E, Form 1, and have met the criterion, go on to the next Item as indicated on your Diagnosis. If you do not meet the criterion, select additional work from the above table and, after completing it, write Item Progress Check II E, Form 2. If you now meet the criterion, go on to the next Item shown on you Diagnosis. If not, see your instructor.

If you have now completed all the work in Unit II, you are now ready to write Unit II Progress Test, Form 1. If you meet the criterion, do Diagnosis III. If not, see your instructor.

Mathematics Item Progress Check

UNIT II: FRACTIONS

ITEM E : DIVISION

Form 1

Name: _____

Date: _____

Criterion: 10/ 10
Score: ___/___

(8) 1. Divide these and write the answers in simplest form.

a. $\frac{1}{2} \div \frac{1}{4} =$ _____

b. $\frac{2}{3} \div 5 =$ _____

c. $8 \div \frac{3}{4} =$ _____

d. $6 \div 2\frac{1}{2} =$ _____

e. $8\frac{6}{7} \div \frac{2}{9} =$ _____

f. $5\frac{2}{7} \div 2\frac{13}{49} =$ _____

g. $\frac{5}{9} \div \frac{15}{21} =$ _____

h. $1 \div \frac{5}{6} =$ _____

Problems: In the space below, show the work you do to solve problems. One mark is for your work, and one mark is for the correct answer.

(2) 2. If a ribbon $10\frac{1}{4}$ feet long was cut into 6 equal pieces, how long would each piece be?

Mathematics Item Progress Check

UNIT II: FRACTIONS Name: _____

ITEM E : DIVISION Date: _____

Form 2

Criterion: 9 /10
Score: ___/___

(8) 1. Divide these and write the answers in simplest form.

a. $\frac{3}{4} \div \frac{5}{6} =$ _____

b. $4\frac{1}{5} \div 3\frac{1}{3} =$ _____

c. $\frac{4}{7} \div 4 =$ _____

d. $10 \div \frac{4}{5} =$ _____

e. $16 \div 2\frac{1}{2} =$ _____

f. $\frac{11}{3} \div \frac{9}{4} =$ _____

g. $7\frac{1}{2} \div 1\frac{1}{4} =$ _____

h. $1 \div \frac{5}{8} =$ _____

Problems: In the space below, show the work you do to solve problems. One mark is for your work, and one mark is for the correct answer.

(2) 2. How many pieces of pipe $3\frac{1}{3}$ feet long can be cut from a piece of pipe which is 30 feet long?

MATHEMATICS

UNIT II: FRACTIONS

ITEM F : PROBLEM SOLVING

OBJECTIVES

The student must be able to:

1. Apply the steps in solving a problem - that is -
   a. Write what is to be found.
   b. Write a word sentence using given facts and telling what is to be found, including what operations are to be used.
   c. Write a number sentence in symbols using given facts and telling what is to be found.
   d. Solve the number sentence. (Calculate what is not known)
   e. Write the answer to the original problem.
2. Apply each or all of the above in solving a given problem.

NOTE: All answers to be given in simplest form. Change improper fractions to mixed numbers.

LEARNING RESOURCES

Books: Basic Mathematics, Bouman and Lindsay
Mathematics, A Basic Course, Cambridge Book Company
Refresher Mathematics, Stein
Learning to Compute, Harcourt, Brace and World, Inc.
General Mathematics, Ginn and Company

LEARNING ACTIVITIES

If you missed either objective 1 or 2, review objective 1 as shown above. This explains the five steps used to solve a problem. Then get a copy of Basic Mathematics and read about how to solve problems on page 44. Notice how the solution to the example on page 44 is written down. Since the bricklayer wants to know how many bricks he used, he adds the four numbers and gets the total number of bricks used. Use this method to solve your problems. Always show the work and calculations you do next to the problem.

Turn to page 171 and do problems 1,3,7, and 8. Then do 15 and 19 on page 172. Check your answers with those in the back of the book. If you made some errors, work more problems from pages 171 and 172.

Now get a copy of Mathematics, A Basic Course, and do problems 1,2,3, and 4 on page 69. Check your answers with those in the separate answer key. If you made some errors, work more problems from page 69.

If your work is correct to this stage, you are ready to write Item Progress Check II F, Form 1. If you need further assistance, use one or more of the following:

Objective	Source Materials	Page(s)	Content
1,2	Learning to Compute	47	addition problems
1,2	"	51	subtraction "
1,2	"	54,58	multiplication "
1,2	"	62-64	division "
1,2			
1,2	Refresher Mathematics	104	addition problems
1,2	"	112	subtraction "
1,2	"	124	multiplication "
1,2	"	132,133	division problems
1,2	General Mathematics	56,63,66, 69,71	problems

After you have written Item Progress Check II F, Form 1, and have met the criterion, you have completed the work in Unit II. You are now ready to write Unit II Progress Test, Form 1. If you meet the criterion on this Test, do Diagnosis III. If not, see your instructor.

If you do not meet the criterion on Item Progress Check II F, Form 1, select additional work from the above table and, after completing it, write Item Progress Check II F, Form 2. If you now meet the criterion, you are ready to write Unit II Progress Test, Form 1.

If you do not meet the criterion on either Item Progress Check II F, Form 2 or on Unit II Progress Test, Form 1, see your instructor. If you meet the criterion on Unit II Progress Test, Form 1, you are ready to write Diagnosis III.

Mathematics Item Progress Check

UNIT II: FRACTIONS Name: _____

ITEM F : PROBLEM SOLVING Date: _____

Form 1

Criterion:	8 / 8
Score:	___/___

Problems: In the space below, show the work you do to solve problems. One mark is for your work, and one mark is for the correct answer.

(2) 1. What fraction of a test is done if you have completed up to question 9 and there are 45 questions on the test?

(2) 2. A $15\frac{3}{4}$ foot long piece of lumber is to be cut into $2\frac{1}{4}$ foot sections. How many pieces of lumber would you have?

(2) 3. Mr. Wilson wishes to know how long it would take him to drive from Prince George to Vancouver. He knows that it will take him approximately $5\frac{3}{4}$ hours to get from Prince George to Cache Creek, $2\frac{2}{3}$ hours from Cache Creek to Hope, and $1\frac{1}{2}$ hours from Hope to Vancouver. How much time should be allowed for the trip?

(2) 4. Mrs. Shepard must travel a distance of 15 miles to go to work. If she travels $2\frac{1}{4}$ miles to a gas station and then $3\frac{2}{5}$ miles to a store, how much further must she travel to arrive at work?

Mathematics Item Progress Check

UNIT II: FRACTIONS Name: _____

ITEM F : PROBLEM SOLVING Date: _____

Form 2

Criterion:	7 / 8
Score:	___/___

Problems: In the space below, show the work you do to solve problems. One mark is for your work, and one mark is for the correct answer.

(2) 1. John worked $4\frac{1}{2}$ hours on Monday, $6\frac{3}{4}$ hours on Tuesday and $5\frac{1}{6}$ hours on Wednesday. He worked $6\frac{1}{3}$ hours on both Thursday and Friday. What is the total of hours worked that week?

(2) 2. If Bill cuts 3 pieces of wood, each $1\frac{3}{8}$ feet long, from a board $7\frac{4}{5}$ feet in length, how long is the board when he has finished with it?

(2) 3. How many pieces of wood, each one $3\frac{1}{7}$ feet in length, can be cut from a board $16\frac{4}{7}$ feet in length?

(2) 4. How long should roast beef be cooked if it weighs $4\frac{3}{4}$ pounds and is to be cooked for 22 minutes per pound? (Round off answer to the nearest minute)

Mathematics Unit Progress Test

UNIT II: FRACTIONS

Name: _____

Form 1

Date: _____

Criterion: 32 /36
Score: ___/___

(2) 1. $\frac{3}{4}$ is a _____. Its denominator is _____.

(3) 2. Give an example of: a. proper fraction _____

b. improper fraction _____

c. mixed number _____

(3) 3. Write in simplest form.

a. $\frac{6}{8} =$ _____ b. $\frac{3}{3} =$ _____ c. $\frac{24}{30} =$ _____

(2) 4. Write as mixed numbers.

a. $\frac{13}{7}$ _____ b. $\frac{9}{8}$ _____

(2) 5. Put the correct number in the ( ) in each of these.

a. $\frac{5}{6} = \frac{(\quad)}{12} = \frac{(\quad)}{18}$

b. $\frac{6}{7} = \frac{18}{(\quad)} = \frac{(\quad)}{28}$

(2) 6. Write equivalent fractions which have the same denominator for the fractions below and then arrange them in order from smallest to largest.

$\frac{3}{5}, \frac{2}{10}, \frac{4}{15}, \frac{7}{20}$ _____, _____, _____, _____

_____, _____, _____, _____

(4) 7. Add these and write the answers in simplest form.

a. $\frac{7}{9} + \frac{2}{9} =$ _____

7. (Cont'd.)

b. $\frac{3}{4} + \frac{2}{3} =$ _____

c. $5\frac{1}{8} + 17\frac{1}{6} =$ _____

d. $4\frac{1}{7} + 16 + 5\frac{3}{14} =$ _____

(3) 8. Subtract these and write the answers in simplest form.

a. $4\frac{13}{17} - 3\frac{9}{17} =$ _____

b. $3\frac{4}{5} - 1\frac{1}{8} =$ _____

c. $7 - 3\frac{3}{8} =$ _____

(2) 9. Multiply these and write the answers in simplest form.

a. $4\frac{2}{3} \times 8\frac{1}{8} =$ _____

b. $5 \times 2\frac{9}{16} =$ _____

(2) 10. Divide these and write the answers in simplest form.

a. $9 \div 3\frac{1}{6} =$ _____

b. $\frac{3}{4} \div \frac{6}{8} =$ _____

(3) 11. Calculate.

a. $\frac{5}{6}$ of 18 = _____

b. 9 is $\frac{1}{8}$ of _____

c. 24 is what fraction of 30? _____
(reduce answer to simplest form)

Problems: In the space below, show the work you do to solve problems. One mark is for your work, and one mark is for the correct answer.

(2) 12. The radiator of certain cars holds 15 quarts. If the radiator contains 6 quarts of anti-freeze and the rest water, what fractional part is anti-freeze? What fractional part is water?

(2) 13. A team played 30 games and won $\frac{2}{3}$ of them. How many games did it lose or tie?

(2) 14. Mr. Brown earned $360.00 in January. He spent $\frac{1}{3}$ of it on rent, $\frac{1}{10}$ on gas, electricity and water, and $\frac{1}{4}$ on groceries. The remainder he deposited in the bank. How much did Mr. Brown deposit in the bank?

(2) 15. Eleanor Jones, a commercial student, typed 225 words in $7\frac{1}{2}$ minutes. How many words did she type each minute?

Mathematics Unit Progress Test

UNIT II: FRACTIONS

Name: _____

Form 2

Date: _____

Criterion: 20 / 24

Score: ___/___

(1) 1. $\frac{7}{9}$ is a _____. The denominator is the _____.

(3) 2. Match by writing the letter of the number on the left with its name on the right.

a. $\frac{12}{11}$ _____ common fraction

b. $\frac{2}{3}$ _____ mixed number

c. $5\frac{1}{8}$ _____ improper fraction

(3) 3. Write in simplest form.

a. $\frac{7}{21}$ _____, b. $\frac{7}{7}$ _____, c. $\frac{3}{15}$ _____

(2) 4. Write as mixed numbers.

a. $\frac{17}{8}$ _____, b. $\frac{40}{13}$ _____.

(1) 5. Write 3 equivalent fractions for $\frac{2}{7}$.

_____ _____ _____

(1) 6. Determine which is the larger of these two fractions by writing them with a common denominator.

$\frac{2}{3}$ $\frac{7}{16}$ larger is _____

(7) 7. Calculate the answers and write them in simplest form.

a. $\frac{1}{5}$ of 40 = _____

b. $\frac{7}{16} + \frac{3}{32}$ = _____

c. $5\frac{1}{8} - 2\frac{1}{3}$ = _____

d. $7\frac{1}{8} + \frac{1}{4}$ = _____

e. $\frac{2}{5} \times \frac{3}{7}$ = _____

f. $\frac{16}{25} \div \frac{4}{5}$ = _____

g. $8 \div \frac{4}{11}$ = _____

Problems: In the space below, show the work you do to solve problems. One mark is for your work, and one mark is for the correct answer.

(2) 8. A recipe called for 6 ounces of lemon concentrate for every 24 ounces of water. If 24 ounces of lemon were used, how much water should be added?

(2) 9. If Mrs. White had three-quarters of a quart of milk and Mrs. Black had two-fifths of a quart of milk, how much milk did they have all together?

(2) 10. 37 1/2 feet of rope was divided into 5 equal pieces. How long was each piece?

Mathematics Diagnosis

UNIT III: RATIO AND PROPORTION

Name: _____

Date: _____

	OBJECTIVE
1. Give an example of a ratio. _____	A-1
2. Give an example of a proportion. _____	A-3
3. Write the ratio of 3 to 4 in two ways. _____ _____	A-2
4. Write the proportion 3 is to 4 as 9 is to 12 in two ways. _____ _____	A-4
5. If you had 42 items correct out of 49 on a test, what is the ratio of right to wrong items? Show your work.	B-1, C-1, C-2
6. Find the number for "n" which would make each of the following a true sentence.	B-2
a. $\frac{6}{4} = \frac{n}{6}$, n = _____	
b. $\frac{5}{n} = \frac{4}{12}$, n = _____	
7. If a recipe calls for 2 cups of flour and ½ cup of butter, how much butter would be required if you used 3 cups of flour? Show your work.	B-3, C-1, C-2

8. If 5 pounds of beef cost $9.00, how much will 7 pounds cost? Show your work.

B-3, C-1, C-2

MATHEMATICS

UNIT III: RATIO AND PROPORTION

ITEM A : READING AND WRITING

OBJECTIVES

The student must be able to:

1. Define ratio by giving an example.
2. Write ratios in the form $\frac{a}{b}$ and a:b.
3. Define a proportion by giving an example.
4. Write proportion in the form $\frac{a}{b} = \frac{c}{d}$

   and a:b = c:d

NOTE: "Proportion means the same as "equivalent ratios"

LEARNING RESOURCES

Books: B Math, Pitman
Basic Mathematics, Bouman and Lindsay
Mathematics, A Basic Course, Cambridge Book Company
Refresher Mathematics, Stein
General Mathematics, Ginn and Company

LEARNING ACTIVITIES

If you missed either objective 1 or 2 on the Diagnosis, get a copy of B Math and read about "The Ratio of Two Numbers" on pages 56 and 57. Then read the examples given on page 221 in Basic Mathematics. Do exercise 8-1 at the top of page 222 and check your answers with those in the back of the book.

If you missed either objective 3 or 4 on the Diagnosis, get a copy of B Math and read about "Proportion - Equal Ratios" on pages 58 and 59. Then read the examples given on page 222 under "Equivalent Ratios" in the book Basic Mathematics. After reading the example in exercise 8-2, do questions a-l at the top of page 223.

Then read the information below exercise 8-2 on page 223 and do exercise 8-3, questions a-l. Read the information at the bottom of page 223 and at the top of page 224. Check your answers to all the exercises with those in the back of the book.

If your work is correct to this stage, you are ready to write Item Progress Check III A, Form 1. If you need further assistance, use one or more of the following:

Objective	Source Materials	Page(s)	Content
1,2	Refresher Mathematics	138, 516 517	information & exercises
3,4	"	517, 520	"
1,2	Mathematics, A Basic Course	158, 159	" "
3,4	"	159 - 161	"
1,2,3,4	General Mathematics	342-344	"

After you have written Item Progress Check III A, Form 1, and have met the criterion, go on to the next Item as indicated on your Diagnosis. If you do not meet the criterion, select additional work from the above table and, after completing it, write Item Progress Check III A, Form 2. If you now meet the criterion, go on to the next Item shown on your Diagnosis. If not, see your instructor.

If you have now completed all the work in Unit III, you are ready to write Unit III Progress Test, Form 1. If you meet the criterion, do Diagnosis IV. If not, see your instructor.

Mathematics Item Progress Check

UNIT III: RATIO AND PROPORTION Name: _____

ITEM A : READING AND WRITING Date: _____

Form 1

Criterion:	6 / 6
Score:	___/___

(1) 1. Give an example of a ratio._____

(2) 2. Write the ratio of 5 to 3 in two ways.

_____ _____

(1) 3. Give an example of a proportion. _____

(2) 4. Write the proportion 1 is to 3 as 4 is to 12 in two ways.

_____ _____

Mathematics Item Progress Check

UNIT III: RATIO AND PROPORTION Name: _____

ITEM A : READING AND WRITING Date: _____

Form 2

Criterion:	4 / 5
Score:	___/___

(1) 1. Give an example of a ratio._____

(1) 2. The ratio of 1 to 3 can be written $\frac{1}{3}$.

Write it another way. _____

(1) 3. Give an example of a proportion._____

(2) 4. Write the proportion 5 is to 2 as 10 is to 4 in two ways.

_____ _____

MATHEMATICS

UNIT III: RATIO AND PROPORTION

ITEM B : OPERATIONS

OBJECTIVES

The student must be able to:

1. Calculate the ratio of two quantities and write it as a common fraction in simplest terms.
2. Solve proportions in which one ratio is incomplete.
3. Use ratio and proportion in solving word problems.

LEARNING RESOURCES

Books:

B Math, Pitman

Basic Mathematics, Bouman and Lindsay

Mathematics, A Basic Course, Cambridge Book Company

Refresher Mathematics, Stein

General Mathematics, Ginn and Company.

LEARNING ACTIVITIES

If you missed objective 1 on the Diagnosis, get a copy of B Math and read about "The Ratio of Two Numbers" on pages 56 and 57. Then do exercise 8-4, question 1 (any 10 questions) on page 224 of the book Basic Mathematics. Check your answers with those in the back of the book.

If you missed objective 2 on the Diagnosis, get a copy of B Math and read about "Proportion-Equal Ratios" on pages 58 and 59. Then read the information on the bottom of page 224 and top of page 225 in the book Basic Mathematics. Do exercise 8-5 on page 225 and check your answers with those in the back of the book.

Then read about the "Ratio Test" on pages 231 and 232 and do exercise 8-7. Check your answers.

If you missed objective 3 on the Diagnosis, get a copy of B Math and read about "Solving Problems of Proportion" on pages 60 and 61. Then do problems 5,6 and 10 on page 61. Turn to page 232 in the book Basic Mathematics and read about "Uses of Ratio" to page 234. Then do exercise 8-8 on pages 234 to 235 doing questions 1 (a-e), 2 (a-c), 3 (a-d), 4 (a-c) and 5 (a-d). Check your answers with those in the back of the book.

If your work is correct to this stage, you are ready to write Item Progress Check III B, Form 1. If you need further assistance, use one or more of the following:

Objective	Source Materials	page(s)	content
1	Refresher Mathematics	516,517,138	information & exercises
2	"	517-520	"
3	"	521	problems
1,2,3	Mathematics, A Basic Course	158-161	information & exercises
1,2,3	General Mathematics	342-349	"

After you have written Item Progress Check III B, Form 1, and have met the criterion, go on to the next Item as indicated on your Diagnosis. If you do not meet the criterion, select additional work from the above table and, after completing it, write Item Progress Check III B, Form 2. If you now meet the criterion, go on to the next Item shown on your Diagnosis.

If you have now completed all the work in Unit III, you are ready to write Unit III Progress Test, Form 1. If you meet the criterion, do Diagnosis IV. If not, see your instructor.

Mathematics Item Progress Check

UNIT III: RATIO AND PROPORTION Name: _____

ITEM B : OPERATIONS Date: _____

Form 1

Criterion:	8 / 8
Score:	___/___

(2) 1. Write these as rations in simplest form. Show your work.

a. Ratio of your age to your mother's if you are 26 and she is 52?

_____

b. Ratio of people per square mile if there are 10,000 people in 200 square miles?

_____

(4) 2. Complete the following by putting the correct number in the ( ).

a. 12:3 = ( ):2

b. 20:( ) = 8:6

c. $\frac{6}{15} = \frac{4}{(\quad)}$

d. $\frac{(\quad)}{42} = \frac{30}{70}$

Problems: In the space below, show the work you do to solve problems. One mark is for your work, and one mark is for the correct answer.

(2) 3. A recipe calls for 8 cups of flour and 12 tablespoons of shortening. How many tablespoons of shortening should be used with 6 cups of flour?

Mathematics Item Progress Check

UNIT III: RATIO AND PROPORTION Name: _____

ITEM B : OPERATIONS Date: _____

Form 2

Criterion:	7 / 8
Score:	___/___

(2) 1. Write the following ratios in simplest form. Show your work.

a. Ratio of right to wrong answers if you got 12 out of 15 correct.

_____

b. Ratio of men to women in a class if there were 6 men and 18 women.

_____

(4) 2. Put the correct number in the ( ) to make these proportions correct.

a. $3:2 = 24:(\ )$ c. $\frac{3}{5} = \frac{(\ )}{40}$

b. $(\ ):7 = 27:63$ d. $\frac{9}{15} = \frac{21}{(\ )}$

Problem: In the space below, show the work you do to solve problems. One mark is for your work, and one mark is for the correct answer.

(2) 3. If Mary bought a dozen (12) oranges for 40¢, what would she have to pay for 15 oranges?

MATHEMATICS

UNIT III: RATIO AND PROPORTION

ITEM C : PROBLEM SOLVING

OBJECTIVES

The student must be able to:

1. Apply the steps in solving a problem - that is -
   a. Write what is to be found.
   b. Write a word sentence using given facts and telling what is to be found, including what operations are to be used.
   c. Write a number sentence in symbols using given facts and telling what is to be found.
   d. Solve the number sentence. (Calculate what is not known)
   e. Write the answer to the original problem.

2. Apply each or all of the above in solving a given problem.

LEARNING RESOURCES

Books:

B Math, Pitman

Basic Mathematics, Bouman and Lindsay

Refresher Mathematics, Stein

General Mathematics, Ginn and Company

LEARNING ACTIVITIES

If you missed objective 1 or 2 on the Diagnosis, get a copy of B Math and read about "Solving Problems of Proportion" on pages 60 and 61. Then do problems 5,6 and 10 on page 61. Turn to page 232 in the book Basic Mathematics and read about "Uses of Ratio" to page 234. Then do exercise 8-8 on pages 234 to 235 doing questions 1 (f-j), 2 (d-f), 3 (e-g), 4 (d-f) and 5 (e-g). Check your answers with those in the back of the book.

If your work is correct to this stage, you are ready to write Item Progress Check III C, Form 1. If you need further assistance, use one or more of the following:

Objective	Source Materials	page(s)	content
1,2	Basic Mathematics	243-245	information & problems
1,2	Refresher Mathematics	138, 521	problems
1,2	General Mathematics	344, 345	information & problems
		348, 349	"

After you have written Item Progress Check III C, Form 1, and have met the criterion, you are ready to write Unit III Progress Test, Form 1. If you meet the criterion on Unit III Progress Test, you are ready to do Diagnosis IV. If not, see your instructor.

If you do not meet the criterion on Item Progress Check III C, Form 1, select additional work from the above table and, after completing it, write Item Progress Check III C, Form 2. If you do not meet the criterion, see your instructor.

If you now meet the criterion, you are ready to write Unit III Progress Test, Form 1. If you meet the criterion on the Unit Test, do Diagnosis IV. If not, see your instructor.

Mathematics Item Progress Check

UNIT III: RATIO AND PROPORTION Name: _____

ITEM C : PROBLEM SOLVING Date: _____

Form 1

Criterion:	8 / 8
Score:	___/___

Problems: In the space below, show the work you do to solve problems. One mark is for your work, and one mark is for the correct answer.

(2) 1. In a class of 18 students, $\frac{8}{9}$ of them were present. How many students were present?

(2) 2. A hockey team plays 18 games and wins 10. What is the ratio of games lost to games played? Give your answer in simplest form.

(2) 3. If a twelve foot long piece of lumber costs $2.16, how much would a 5 foot piece cost?

(2) 4. If 11 acres of land cost $2,255, what will 20 acres cost at the same price?

Mathematics Item Progress Check

UNIT III: RATIO AND PROPORTION Name: _____

ITEM C : PROBLEM SOLVING Date: _____

Form 1

Criterion:	7 / 8
Score:	___/___

Problems: In the space below, show the work you do to solve problems. One mark is for your work, and one mark is for the correct answer.

(2) 1. At one time, haircuts cost 75¢. Now they are $3.00. What is the ratio of the cost of haircuts in the past to the cost now?

(2) 2. During the first 126 games of the season, the football team won 28 games. If this ratio is kept up, how many games will the team win in a total season of 162 games?

(2) 3. Find the cost of the following:

6 packages of gum at 3 for 10¢

9 bars of soap at 3 for 56¢

5 cans of beans at 3 for 54¢

(2) 4. If 3 out of every 8 Cadillacs were recalled because of defects in 1972; how many of the total 5,768 cars were recalled?

Mathematics Unit Progress Test

UNIT III: RATIO AND PROPORTION Name: _____

Form 1 Date: _____

Criterion: 10/ 12

Score: ___/___

(2) 1. Write the ratio of 5 to 7 in two ways.

_____ _____

(2) 2. Write the proportion 5 is to 8 as 15 is to 24 in two ways.

_____ _____

(4) 3. Put the correct number in the ( ) to make these proportions correct.

a. 5:9 = 20: ( )

b. ( ):4 = 18:24

c. $\frac{11}{35} = \frac{33}{(\quad)}$

d. $\frac{6}{1} = \frac{(\quad)}{8}$

Problems: In the space below, show the work you do to solve problems. One mark is for your work, and one mark is for the correct answer.

(2) 4. A farmer had the following livestock; 3 sheep, 6 pigs, 12 cows, and 16 horses. Give answers in simplest form for the ratio of:

a. horses to sheep _____

b. pigs to cows _____

c. pigs to horses _____

(2) 5. A recipe called for 6 ounces of lemon concentrate for every 24 ounces of water. If 24 ounces of concentrated lemon were used, how much water should be added?

Mathematics Unit Progress Test

UNIT III: RATIO AND PROPORTION Name: _____

Form 2 Date: _____

Criterion: 10 /12
Score: ___/___

(2) 1. Write the ratio of 13 to 7 in two ways.

_____ _____

(2) 2. Write the proportion 2 is to 7 as 10 is to 35 in two ways.

_____ _____

(4) 3. Put the correct number in the ( ) to make these proportions correct.

a. 3:8 = 15: ( )

b ( ):12 = 5:3

c. $\frac{2}{7} = \frac{8}{(\ )}$

d. $\frac{3}{(\ )} = \frac{12}{80}$

Problems: In the space below, show the work you do to solve problems. One mark is for your work, and one mark is for the correct answer.

(2) 4. A pet shop had 4 kittens, 2 rabbits, 10 mice and 8 canaries. Give answers in simplest form for the ratio of:

a. canaries to kittens _____

b. rabbits to mice _____

c. rabbits to canaries _____

(2) 5. The anti-freeze mixture for a car called for 2 pints of anti-freeze for every 5 pints of water. If 6 pints of anti-freeze are used, how many pints of water are needed?

Mathematics Diagnosis

UNIT IV: DECIMALS

Name: _____

Date: _____

* Express all fractions in decimal form in your answers.

OBJECTIVE

1. Define a decimal number and give an example. A-1

_____

_____

2. Write the following as fractions or mixed numbers. A-2

a. .3 _____ c. .43 _____

b. 0.4 _____ d. 7.656 _____

3. Write as decimals. A-3

a. seven-tenths _____

b. sixty-five one-hundredths _____

c. twenty-two and four hundred fifty-seven thousandths.

_____

d. two thousand three hundred two ten-thousandths.

_____

4. Arrange the following in order from smallest to largest. A-4

.8, .567, .78, .4256, 2.1

_____ _____ _____ _____ _____.

5. Round off 4.2653 to nearest: A-5

a. tenth _____
b. hundredth _____
c. thousandth _____
d. ten-thousandth _____

6. Arrange these numbers for subtraction or addition. Then show your answer to the question. B-1

a. 15.731 - 2.4 =

b. 42 + 6.3 + 63.72 + .420 =

7. Find the sum in each of the following B-2

a. $\begin{array}{r} 63.2 \\ \underline{2.8} \end{array}$ b. $\begin{array}{r} .321 \\ \underline{.047} \end{array}$ c. $\begin{array}{r} 3.49 \\ .07 \\ \underline{6.21} \end{array}$

8. Find the difference in each of the following.

a. 7.6 - 2.01 = _____ B-3

b. $\begin{array}{r} 4.769 \\ \underline{.378} \end{array}$ c. $\begin{array}{r} 33.58 \\ \underline{4.49} \end{array}$ d. $\begin{array}{r} 13.41 \\ \underline{7.60} \end{array}$ B-3

9. On a holiday trip by car gasoline was bought in the following amounts: 17.8 gallons, 14.2 gallons, 7.9 gallons, 15 gallons and 18.1 gallons. How much gasoline was used for the trip? Show your work. B-4

10. A building was 39.8 feet high and 42.5 feet wide. It was _____feet wider than it was high. Show your work. B-4

11. Find the product of each of the following.

a. $\begin{array}{r} 2.3 \\ \times\ 0.9 \\ \hline \end{array}$ b. $\begin{array}{r} 4.9 \\ \times\ 3.27 \\ \hline \end{array}$ c. $\begin{array}{r} .0061 \\ \times\ .0102 \\ \hline \end{array}$

C-1

12. Find the product of each of the following.

a. $2.3 \times .1 =$ _____

b. $4.6 \times .01 =$ _____

c. $6.8 \times .001 =$ _____

$.004 \times 100 =$ _____

C-2

13. Find the quotients in each of the following.

a. $6\overline{)10}$ b. $12\overline{)8}$ C-3

c. $5\overline{)2.5}$ d. $9\overline{).0081}$ C-3

e. $.012\overline{)1.44}$ f. $37.3\overline{)37.673}$ C-4

g. $7.60\overline{)114.}$ h. $89\overline{)144.18}$ C-4

14. Find the quotients in each of the following:

a. $15.7 \div .1 =$ _____

b. $4 \div .001 =$ _____ C-5

c. $.069 \div 100 =$ _____

15. After travelling 250 miles, a car required 16 gallons of gas to refill it. How many miles will it go on each gallon? (Calculate to nearest tenth of a mile.) C-6
Show your work.

16. A patient in a hospital required .9 pints of blood on each of 3 days. How much blood was used? C-6
Show your work.

17. Change to decimal numbers.

a. $\frac{1}{2} =$ _____ d. $\frac{3}{4} =$ _____ D-1

b. $\frac{5}{8} =$ _____ e. $\frac{7}{12} =$ _____

c. $\frac{1}{8} =$ _____

18. Change to fractions in simplest form. D-3

a. .375 = _____ c. .1 = _____

b. 6.75 = _____ d. .625 = _____

19. Do these.

a. $2.716 \times 2\frac{1}{10} =$ _____ D-4

b. $15\frac{1}{2} - 4.5 =$ _____ D-4

c. $100.00 - 57.01 =$ _____ D-4

d. $2\frac{3}{4} + 4.125 + .375 =$ _____ D-4

20. Write in numbers.

a. Two dollars and fifty-three cents. _____ D-5

b. Eighty-nine cents _____

c. One hundred seventeen dollars and ninety-five cents _____

21. Write in words.

$3.05 _____ D-5

22. How much is:

a. 4 dimes and 3 nickels? _____ D-6

b. 3 pennies, two 5 dollar bills and 3 quarters? _____

23. Find the money combinations which could be used to pay the following amounts and complete the table.

D-7

	Dollars	Quarters	Dimes	Nickels	Pennies
a. 5.60					
b. 17.79					
c. 7.95					
d. 37.49					

24. Supplies for a party cost $15.30. Jane had $\frac{1}{3}$ of this, Bob had $\frac{1}{2}$ of it and Bill had the rest.

E-1, E-2

How much did each pay ?

Show your work.

Jane _____

Bob _____

Bill _____

25. A man set out on a car trip totalling 5,000 miles. If in the first five days, he travels 483.6 miles; 379.3 miles; 351.8 miles; 401.6 miles; 379.3 miles, how far has he yet to go ? Show your work!

E-1, E-2

26. A 14 storey building is 138.74 feet high. What is the height per storey ? Show your work!

E-1,
E-2

MATHEMATICS

UNIT IV: DECIMAL NUMBERS

ITEM A : READING, WRITING AND ROUNDING OFF

OBJECTIVES

The student must be able to:

1. Define a decimal number as a way of naming fractions that have a multiple of 10 as a denominator, such as $0.6 = \frac{6}{10}$ and $0.66 = \frac{66}{100}$

2. Read given decimal numbers to 10 thousandths (types: .3, 0.3, 3.3, .435, 42.6357) as tenths, hundredths, thousandths and ten thousandths.

3. Write decimal numbers to 10-thousandths from the written name of the number.

4. Arrange a set of decimal numbers in a given order.

5. Round off decimal numbers to nearest tenth, hundredth, thousandth or ten-thousandth.

LEARNING RESOURCES

Books: Basic Mathematics, Bouman and Lindsay
Mathematics, A Basic Course, Cambridge Book Company
Learning to Compute, Harcourt, Brace & World Inc.
Refresher Mathematics, Stein
General Mathematics, Ginn and Company

LEARNING ACTIVITIES

If you missed any of objectives 1,2 or 3 on the Diagnosis, get a copy of Refresher Mathematics and read pages 149 and 150.

Then write the Diagnostic Test A on page 151, doing only the odd numbered questions. Check your answers with those in the back of the book. Do sets in the "related practice examples" on page 151 which correspond to the questions you missed in the Diagnostic Test (for example, if you missed question 3, do set 3 as an exercise). Then write Diagnostic Test B on page 152 (odd numbers only) and check your answers. Do sets in the "related practice examples" on pages 152 to 154 which correspond to the questions you missed in the Diagnostic Test.

Information for objective 4 is found on page 173. After studying the sample solutions, write the Diagnostic Test on page 173, doing only the odd numbered questions. Check your answers with those in the back of the book. Do sets in the "related practice examples" on page 174 which correspond to the questions you missed in the Diagnostic Test.

Information for objective 5 is found on page 155. After studying the sample solutions, write the Diagnostic Test on page 156, doing only the odd numbered questions. Check your answers with those in the back of the book. Do sets in the "related practice examples" on pages 156 and 157 which correspond to the questions you missed in the Diagnostic Test.

If your work is correct to this stage, you are ready to write Item Progress Check IV A, Form 1. If you need further assistance, use one or more of the following:

Objective	Source Materials	page(s)	Content
1	Basic Mathematics	179, 180	information
2,3	"	181, 182	information & exercises
5	"	204, 205	"
2	Learning to Compute	66	information
1,4	"	67	information & exercises
[illegible]	"	68	"
5	"	71-75	"
1,2,3	Mathematics, A Basic Course	70-73	"
5	"	73-75	"
4	"	75-77	"
1	General Mathematics	71	information
2,3	"	72,73	"
5	"	80	"

After you have written Item Progress Check IV A, Form 1, and have met the criterion, go on to the next Item as indicated on your Diagnosis. If you do not meet the criterion, select additional work from the table on the opposite page and after completing it, write Item Progress Check IV A, Form 2. If you now meet the criterion, go on to the next Item shown on your Diagnosis. If not, see your instructor.

If you have now completed all the work in Unit IV, you are ready to write Unit IV Progress Test, Form 1. If you meet the criterion, do Diagnosis V. If not, see your instructor.

Mathematics Item Progress Check

UNIT IV: DECIMAL NUMBERS Name: _____

ITEM A : READING, WRITING AND ROUNDING OFF Date: _____

Form 1

Criterion: 11/ 11

Score: ___/___

(1) 1. Define "decimal numbers" and give an example.

_____

(3) 2. Write the word name for these numbers.

a. .3 _____

b. 5.05 _____

c. 56.472 _____

(4) 3. Write these in decimal numbers.

a. seven-tenths _____

b. six and six-tenths _____

c. seventy-two thousandths _____

d. one hundred five and forty-hundredths _____

(1) 4. Which is the larger of these numbers?

0.46 .046 _____

(2) 5. Round off 9.5726 to the nearest:

a. tenth _____

b. thousandth _____

Mathematics Item Progress Check

UNIT IV: DECIMAL NUMBERS Name: _____

ITEM A : READING, WRITING AND ROUNDING OFF Date: _____

Form 2

Criterion: 10 /11

Score: ___/___

(1) 1. Define a decimal number by completing this sentence:
A decimal number is _____

_____

(3) 2. Write the word name for these numbers.

a. .1 _____

b. 3.65 _____

c. 29.502 _____

(4) 3. Write these as decimal numbers

a. nine-tenths _____

b. twelve and five-tenths _____

c. fifty-six hundredths _____

d. twenty-two and two hundred sixty-nine thousandths

_____

(1) 4. Arrange these in order from smallest to largest.

0.892, 8.92, 0.982, 98.2

_____, _____, _____, _____

(2) 5. Round off 8.157 to the nearest:

a. tenth _____

b. hundredth _____

MATHEMATICS

UNIT IV: DECIMAL NUMBERS

ITEM B : ADDITION AND SUBTRACTION

OBJECTIVES

The student must be able to:

1. Arrange a set of decimal numbers with different decimal places so that they can be added vertically by proper place value.

2. Calculate sums of given decimal numbers and round off, if required.

3. Calculate differences of given pairs of decimal numbers and round off if required.

4. Use addition and subtraction of decimal numbers in solving word problems.

LEARNING RESOURCES

Books:

Basic Mathematics, Bouman and Lindsay

Mathematics, A Basic Course, Cambridge Book Co.

Refresher Mathematics, Stein

Learning to Compute, Harcourt, Brace and World Inc.

General Mathematics, Ginn and Company

LEARNING ACTIVITIES

If you missed either objective 1 or 2 on the Diagnosis, get a copy of Refresher Mathematics and read pages 158 and 159. Then write the Diagnostic Test on pages 159 and 160, doing only the odd numbered questions. Check your answers with those in the back of the book. Do sets in the "related practice examples" on pages 160 to 163 which correspond to the questions you missed on the Diagnostic Test (for example, if you missed question 3, do set 3 as an exercise).

If you missed objective 3 on the Diagnosis, read pages 166 and 167. Then write the Diagnostic Test on page 167, doing only the odd numbered questions. Check your answers with those in the back of the book. De sets in the "related practice examples" on pages 168 to 170 which correspond to the questions you missed in the Diagnostic Test (for example, if you missed question 3, do set 3 as an exercise).

Problems for objective 4 are found in the book Mathematics, A Basic Course, on page 86. Do problems 3,4,5,6 and 7 and check your answers with those in the separate answer key. If you made any errors, do more problems from page 86.

If your work is correct to this stage, you are ready to write Item Progress Check IV B, Form 1. If you need further assistance, use one or more of the following:

Objective	Source Materials	Page(s)	Content
1,2	Basic Mathematics	183-187	information & exercises
3	"	192-195	"
1,2	Learning to Compute	78	"
1,3	"	79	"
4	"	79	problems
4	Refresher Mathematics	163-164	addition problems
4	"	171	subtraction problems
1,2	Mathematics, A Basic Course	83, 84	information & exercises
1,3	"	84, 85	"
1,2,3	General Mathematics	75, 76	"

After you have written Item Progress Check IV B, Form 1, and have met the criterion, go on to the next Item as indicated on your Diagnosis. If you do not meet the criterion, select additional work from the above table and, after completing it, write Item Progress Check IV B, Form 2. If you now meet the criterion, go on to the next Item shown on your Diagnosis. If not, see your instructor.

If you have now completed all the work in Unit IV, you are ready to write Unit IV Progress Test, Form 1. If you meet the criterion, do Diagnosis V. If not, see your instructor.

Mathematics Item Progress Check

UNIT IV: DECIMAL NUMBERS Name: _____

ITEM B : ADDITION AND SUBTRACTION Date: _____

Form 1

Criterion: 12 /12
Score: ___/___

(4) 1. Add the following.

a. 3.407
0.003
4.080
2.510

b. .06
.70
3.02

c. .7 + .03 + 1.0 = _____

d. 13.1 + 1.32 + 132.0 = _____

(4) 2. Subtract the following.

a. 1.7345
.6346

b. 8.091
.809

c. 11.01 - .92 = _____

d. 10.00 - 9.99 = _____

Problems: In the space below, show the work you do to solve problems. One mark is for your work, and one mark is for the correct answer.

(2) 3. A.B. Lee travelled 33.4 miles, 122.89 miles and 10.05 miles in three days. How far did he travel all together?

(2) 4. A firecracker rocket reached a height of 247.33 feet above the earth's surface before it exploded. If the fireballs fell to 158.35 feet above the earth's surface before they were completely extinquished, how many feet did they travel while burning?

Mathematics Item Progress Check

UNIT IV: DECIMAL NUMBERS Name: _____

ITEM B : ADDITION AND SUBTRACTION Date: _____

Form 2

Criterion:	9 /10
Score:	___/___

(3) 1. Add the following.

a.
$$\begin{array}{r} 32.403 \\ 8.92 \\ 122.566 \\ \underline{12.333} \end{array}$$

b.
$$\begin{array}{r} .92 \\ .05 \\ \underline{.03} \end{array}$$

c. .3 + .07 + 3.12 = _____

(3) 2. Subtract the following.

a.
$$\begin{array}{r} 3.9898 \\ \underline{2.9999} \end{array}$$

b.
$$\begin{array}{r} 0.0010 \\ \underline{0.0003} \end{array}$$

c. 13.42 - 4.38 = _____

Problems: In the space below, show the work you do to solve problems. One mark is for your work, and one mark is for the correct answer.

(2) 3. George Jackson ran three 100-yard dashes in 9.8, 10.2, and 9.9 seconds. At a later date he ran a 300-yard dash in 30.5 seconds. How much less time did it take him to run 300-yards when he ran the three 100-yard dashes then the One 300-yard dash?

(2) 4. Bill has a compact car and John has a big car. On a trip the small car used 5.9 gallons of gas and the big car used 9.3 gallons. How much more gas did the big car use?

MATHEMATICS

UNIT IV: DECIMAL NUMBERS

ITEM C : MULTIPLICATION AND DIVISION

OBJECTIVES

The student must be able to:

1. Calculate products of decimal numbers and round off if required.
2. Mentally calculate products involving multiplication by .001, .01, .1, 10, 100, 1000, etc.
3. Calculate quotients to a given number of decimal places when dividing by a whole number and:
   (a) a smaller whole number
   (b) a larger whole number
   (c) a decimal number
4. Calculate quotients to a given number of decimal places when dividing by a decimal number.
5. Mentally calculate quotients when dividing by .001, .01, .1, 10, 100, 1000, etc.
6. Use multiplication and division of decimal numbers in solving word problems.

LEARNING RESOURCES

Books: Basic Mathematics, Bouman and Lindsay
Mathematics, A Basic Course, Cambridge Book Company
Refresher Mathematics, Stein
Learning to Compute, Harcourt, Brace and World, Inc.
General Mathematics, Ginn and Company

LEARNING ACTIVITIES

If you missed either objective 1 or 2 on the Diagnosis, get a copy of Basic Mathematics and read pages 196 and 197. Then do exercise 7-13, questions 1(a-j) and 2(a-h). Check your answers with those in the back of the book. Do additional questions from page 197 if you made errors. Then read about the "rule" at the bottom of page 197 and top of page 198. Now do exercise 7-14, question 1(a-g) and 2(a-g) on page 198. Check your answers. Do additional problems if you have made errors. Read from the bottom of page 198 to the top half of page 199. Do exercise 7-15, questions 1(a-c) and 2(a-h). Check your answers.

If you missed either objective 3 or 4 on the Diagnosis, read about "Division of Decimals" on pages 199 and 200. Study the examples on page 200 and do exercise 7-16, questions 1(a-h) and 2(a-g) and question 3(a-h) on page 201 (Notice the examples given). Check your answers. Do additional problems if you have made errors. Read exercise 7-17 on pages 202 and 203 and do exercise 7-18, questions 1(a-h, r-t) and 2(a-d). Check your answers.

If you missed objective 5 on the Diagnosis, read "Division by 10,100 and 1000" on page 206 and 207. Do exercise 7-20, question 1(a-f) and 2(a-i) on page 207. Check your answers. Do additional problems if you have made errors.

If you have missed objective 6 on the Diagnosis, review the method used to solve problems on page 44 and do problems 3, 7, 8, 9 and 11 on page 215. Check your answers.

If your work is correct to this stage, you are ready to write Item Progress Check IV C, Form 1. If you need further assistance, use one or more of the following sources, from the chart on the next page.

* *After doing the work you need from the chart go on to the following directions.*

After you have written Item Progress Check IV C, Form 1, and have met the criterion, go on to the next Item as indicated on your Diagnosis. If you do not meet the criterion, select additional work from the chart on the next page and after completing it, write Item Progress Check IV C, Form 2. If you now meet the criterion, go on to the next Item shown on your Diagnosis. If not, see your instructor.

If you have now completed all the work in Unit IV, you are ready to write Unit IV Progress Test, Form 1. If you meet the criterion, do Diagnosis V. If not, see your instructor.

Objective	Source Materials	Page(s)	Content
1	Learning to Compute	82-84	information & exercises
6	"	84-86	problems(multiplication)
3	"	87,88	information & exercises
4	"	89,90, 92	"
6	"	88,91	problems(division)
1	Refresher Mathematics	175-180	information & exercises
3	"	182-185	"
4	"	186-190	"
6	"	180,181	problems(multiplication)
6	"	191	problems(division)
2	"	193,194	information & exercises
5	"	196,197	"
1	Mathematics, A Basic Course	88-90	"
2	"	92,93	"
3	"	93-95	"
4	"	96-99	"
5	"	99,100	"
6	"	100,101	problems
1,2,3,4,5,6	General Mathematics	77,78	information & exercises

Mathematics Item Progress Check

UNIT IV: DECIMAL NUMBERS **Name:** _____

ITEM C : MULTIPLICATION AND DIVISION **Date:** _____

Form 1

Criterion:	12 / 12
Score:	___ / ___

(3) 1. Multiply the following. Show your work.

a. $\begin{array}{r} 3.04 \\ \times\ .19 \\ \hline \end{array}$ b. $\begin{array}{r} 0.025 \\ \times\ .0334 \\ \hline \end{array}$ c. $\begin{array}{r} 193.2 \\ \times\ 8.76 \\ \hline \end{array}$

(5) 2. Divide the following, give answers to 3 decimal places. Show your work.

a. $21.7\overline{)347.2}$ b. $.005\overline{).0105}$

c. $88\overline{)352.88}$ d. $35.7\overline{)1.5351}$

e. $12\overline{)8.}$

Problems: In the space below, show the work you do to solve problems. One mark is for your work, and one mark is for the correct answer.

(2) 3. Air Canada flew a jet for 30.25 hours at an average speed of 537.8 miles per hour. What was the total distance travelled? (give answer to 2 decimal places)

(2) 4. A.B. Earth dug a well 28.91 feet deep. If water poured into the well at a rate of 7.7 feet per hour, how long would it take before the well was full? Give answer to 3 decimal places.

Mathematics Item Progress Check

UNIT IV: DECIMAL NUMBERS **Name:** _____

ITEM C : MULTIPLICATION AND DIVISION **Date:** _____

Form 2

Criterion:	10/ 12
Score:	___/___

(3) 1. Multiply the following. Show your work.

a. $\begin{array}{r} 8.123 \\ \times\ 4.567 \\ \hline \end{array}$ b. $\begin{array}{r} 9.023 \\ \times\ .035 \\ \hline \end{array}$ c. $\begin{array}{r} 121 \\ \times\ .10 \\ \hline \end{array}$

(5) 2. Divide the following. Show your work. Give answer to 3 decimal places.

a. $11.9\overline{)3.213}$ b. $18\overline{).09}$

c. $.086\overline{)7826}$ d. $48\overline{)158.4}$

e. $100\overline{).45}$

Problems: In the space below, show the work you do to solve problems. One mark is for your work, and one mark is for the correct answer.

(2) 3. The fuel burned by a certain plane is 45.6 gallons each hour. How many hours can the plane fly if its tank holds 200 gallons? Give your answer to the nearest tenth of an hour.

(2) 4. An electric iron uses 3.2 kilowatts of electricity every hour it is used. If electricity costs 7.5 cents for each kilowatt hour, what will it cost to use the iron for 3 hours? (round off your answer to the nearest cent)

MATHEMATICS

UNIT IV: DECIMAL NUMBERS

ITEM D : EQUIVALENTS AND MONEY SYSTEM

OBJECTIVES

The student must be able to:

1. Change common fractions and mixed numbers to decimal numbers by dividing numerator by denominator.
2. State the decimal equivalents of $\frac{1}{8}, \frac{1}{4}, \frac{1}{3}, \frac{1}{2}, \frac{1}{5}, \frac{2}{3}, \frac{2}{5}, \frac{3}{5}, \frac{4}{5}, \frac{3}{4}$ from memory.
3. Change decimal numbers to fractions by writing with the correct multiple of 10 as denominator and then finding simplest form.
4. Calculate sums, differences, products and quotients of whole numbers, fractions or decimals.
5. Read and write numbers stating value in dollars and cents.
6. State money value of given combinations of cents, nickels, dimes, quarters and dollars.
7. Equate given money values to number of dollars, quarters, dimes, nickels, cents.
8. Solve word problems involving decimal equivalents of fractions and money.

LEARNING RESOURCES

Books: Basic Mathematics, Bouman and Lindsay
Mathematics, A Basic Course, Cambridge Book Company
Refresher Mathematics, Stein
Learning to Compute, Harcourt, Brace and World, Inc.
General Mathematics, Ginn and Company

LEARNING ACTIVITIES

If you missed objective 1 on the Diagnosis, get a copy of Refresher Mathematics, read page 200 and do the Diagnostic Test on page 201 (odd numbered questions only). Check your answers with those in the back of the book. Do sets in the "related practice examples" on page 201 which correspond to the questions you missed on the Diagnostic Test (for example, if you missed question 3, do set 3 as an exercise).

If you missed objective 2 on the Diagnosis, study page 205 for the decimal equivalents mentioned in the objective.

If you missed objective 3 on the Diagnosis, read pages 203 and 204 and do the Diagnostic Test on page 204 (odd numbered questions only). Check your answers. Do sets in the "related practice examples" on page 204 which correspond to the questions you missed on the Diagnostic Test (for example, if you missed question 3, do set 3 as an exercise).

If you missed objective 4 on the Diagnosis, read pages 206 and do Diagnostic Test A. Do all four questions, check the answers to odd numbered questions in the back of the book, and even numbers with another student or your instructor. Then do sets in the "related practice examples" on page 207 which correspond to the questions you missed on the Diagnostic Test. (for example, if you missed question 3, do set 3 as an exercise). Check your answers. Now write Diagnostic Test B on page 207. Do all four questions and work the necessary sets on page 207 and 208. Check your answers.

If you missed objective 5 on the Diagnosis, get a copy of Basic Mathematics and read page 377. Then do exercise 12-1 on pages 377 and 378, doing questions a, b, c, d, f and i. Check your answers with those in the back of the book.

If you missed objective 6 or 7 on the Diagnosis, turn to page 387 in Basic Mathematics and do exercise 12-8, question 1a(a-d), 1b(a-d) and question 2(a-h). Check your answers with those in the back of the book. Read over the information at the bottom of page 387 and the top half of page 388. Then do exercise 12-9, question 1(a,b,e,f,j,k and p), 2(a,c), 3(a,e,j,l), 4(a,b,c,d), 5(a,c,g). Check our answers.

If you missed objective 8 on the Diagnosis, turn to page 202 in Refresher Mathematics and do problem 1. Then do the "Practical Applications " at the bottom of page 208, questions 1,3,5 and 7. Check your answers. Then, in Basic Mathematics on page 393, do questions 1,2,3 and 4. Check your answers with those in the back of the book. Do additional problems from page 393 if you have difficulty.

If your work is correct to this stage, you are ready to write Item Progress Check IV D, Form 1. If you need further assistance, use one or more of the following:

Objective	Source Materials	Page(s)	Content
1	Learning to Compute	94	information & exercises
2, 3	Mathematics, A Basic Course	78, 79	"
1	"	80, 81	"
1	General Mathematics	73-75	"
8	Basic Mathematics	393, 394	problems

After you have written Item Progress Check IV D, Form 1, and have met the criterion, go on to the next Item as indicated on your Diagnosis. If you do not meet the criterion, select additional work from the table on the last page and, after completing it, write Item Progress Check IV D, Form 2. If you now meet the criterion, go on to the next Item shown on your Diagnosis. If not, see your instructor.

If you have now completed all the work in Unit IV, you are ready to write Unit IV Progress Test, Form 1. If you meet the criterion, do Diagnosis V. If not, see your instructor.

Mathematics Item Progress Check

UNIT IV: DECIMAL NUMBERS Name: _____

ITEM D : EQUIVALENTS AND MONEY SYSTEM Date: _____

Form 1

Criterion: 16 /16
Score: ___/___

(4) 1. Change to decimal numbers.

a. $\frac{8}{10}$ _____ c. $\frac{9}{15}$ _____

b. $1\frac{2}{5}$ _____ d. $\frac{56}{80}$ _____

(4) 2. Change to common fractions or mixed numbers in simplest form.

a. .8 _____ c. 5.64 _____

b. 1.25 _____ d. .03 _____

(4) 3. Do these.

a. $5\frac{1}{2} + 2.25 =$ _____

b. $10.05 - 5\frac{2}{5} =$ _____

c. $\frac{1}{4}$ of 96 = _____

d. Which is larger: $\frac{3}{8}$ inch or .351 inch? _____

(1) 4. Write "five dollars and sixty-three cents" in numbers.

_____

(1) 5. What combination of exact change would you use to pay a bill of $3.95?

___dollars, ____quarters, ___dimes, ___nickels, ___ pennies.

Problem In the space below, show the work you do to solve problems. One mark is for your work, and one mark is for the correct answer.

(2) 6. What will two tires cost if the first tire is $34.90 and the second is bought at half price?

Mathematics Item Progress Check

UNIT IV: DECIMAL NUMBERS Name: _____

ITEM D : EQUIVALENTS AND MONEY SYSTEM Date: _____

Form 2

Criterion:	14 /16
Score:	___/___

(4) 1. Change to decimal numbers.

a. $\frac{3}{10}$ _____ c. $\frac{14}{25}$ _____

b. $1\frac{1}{5}$ _____ d. $\frac{5}{12}$ _____

(4) 2. Change to common fractions or mixed numbers in simplest form.

a. .4 _____ c. 2.42 _____

b. 1.75 _____ d. .05 _____

(4) 3. Do these.

a. $3.25 \times 1\frac{1}{4} =$ _____

b. $97\frac{1}{2} - 7.5 =$ _____

c. $\frac{4}{5}$ of 190 = _____

d. Which is smaller: .55 inch or $\frac{7}{16}$ inch? _____

(1) 4. Write "seven dollars and seventy-five cents" in numbers.

_____

(1) 5. What combination of exact change would you use to pay a bill of $4.79?

___ dollars, ___ quarters, ___ dimes, ___ nickels, ___ pennies.

Problem: In the space below, show the work you do to solve problems. One mark is for your work, and one mark is for the correct answer.

(2) 6. In a sale, tooth paste is selling at $\frac{1}{3}$ off. If the original price is 69¢ a tube, what will it cost you for 6 tubes at the sale price?

MATHEMATICS

UNIT IV: DECIMAL NUMBERS

ITEM E : PROBLEM SOLVING

OBJECTIVES

The student must be able to:

1. Apply the steps in solving a problem - that is -
   a. Write what is to be found.
   b. Write a word sentence using given facts and telling what is to be found, including what operations are to be used.
   c. Write a number sentence in symbols using given facts and telling what is to be found.
   d. Solve the number sentence. (Calculate what is not known)
   e. Write the answer to the original problem.
2. Apply each or all of the above in solving a given problem.

LEARNING RESOURCES

Books: Basic Mathematics, Bouman and Lindsay
Mathematics, A Basic Course, Cambridge Book Company
Refresher Mathematics, Stein
Learning to Compute, Harcourt, Brace and World Inc.
General Mathematics, Ginn and Company

LEARNING ACTIVITIES

If you missed objective 1 or 2 on the Diagnosis, review the objectives listed on this sheet, get a copy of Basic Mathematics, and read about "Problems" on page 44. Then do the following

problems on pages 215 and 216: 1, 3, 4, 7, and 13. Check your answers with those in the back of the book. If you have difficulties, do additional problems from page 215 and 216.

If your work is correct to this stage, you are ready to write Item Progress Check IV E, Form 1. If you need further assistance, use one or more of the following:

Objective	Source Materials	Page(s)	Content
1,2	Learning to Compute	79,88,91	problems
1,2	Refresher Mathematics	163,164	addition problems
1,2	"	171	subtraction problems
1,2	"	180,181	multiplication problems
1,2	"	191	division problems
1,2	"	202,208	equivalents
1,2	General Mathematics	76,78,80	problems
1,2	Mathematics, A Basic Course	86,93,100	"

After you have written Item Progress Check IV E, Form 1, and have met the criterion, you are ready to write Unit IV Progress Test, Form 1. If you meet the criterion on Unit IV Progress Test, you are ready to do Diagnosis V. If not, see your instructor.

If you do not meet the criterion on Item Progress Check IV E, Form 1, select additional work from the above table and, after completing it, write Item Progress Check IV E, Form 2. If you do not meet the criterion, see your instructor.

If you now meet the criterion, you are ready to write Unit IV Progress Test, Form 1. If you meet the criterion on the Unit Test, do Diagnosis V. If not, see your instructor.

Mathematics Item Progress Check

UNIT IV: DECIMAL NUMBERS Name: _____

ITEM E: PROBLEM SOLVING Date: _____

Form 1

Criterion:	8 / 8
Score:	___/___

Problems: In the space below, show the work you do to solve problems. One mark is for your work and one mark is for the correct answer.

(2) 1. A piece of paper is .008 inches thick. If a package of paper contains 24 of these sheets, how thick is the package?

(2) 2. A board 12.7 feet long was divided into 4 equal parts. What was the length of each part?

(2) 3. During a series of flights a pilot flew a plane for the following distances, 327.8 miles, 154 miles, 624.2 miles, 458.4 miles and 249.6 miles. What was the total number of miles the pilot flew?

(2) 4. A piece of metal 41.54 feet long became .005 feet shorter during cold weather. What was its new length?

Mathematics Item Progress Check

UNIT IV: DECIMAL NUMBERS Name: _____

ITEM E : PROBLEM SOLVING Date: _____

Form 2

Criterion:	7 / 8
Score:	___/___

Problems: In the space below, show the work you do to solve problems. One mark is for your work, and one mark is for the correct answer.

(2) 1. A tank when .6 full contains 10.8 gallons. How much will it contain when it is .8 full?

(2) 2. A dealer buys 72 dresses, each of which costs $3.75. How much does he pay for the dresses?

(2) 3. A dealer purchased 8 boxes of candy for $8.16. If each box contained 12 candy bars, what was the cost of each bar?

(2) 4. A sailor travels the following distances during a 5 day period: 105.2 miles, 94.7 miles, 153.5 miles, 57.9 miles and 174.8 miles. How many miles has he travelled after the 5 days?

Mathematics Unit Progress Test

UNIT IV: DECIMAL NUMBERS Name: _____

Form 1 Date: _____

Criterion: 34 /37
Score: ___/___

(1) 1. .3 means (check the correct one):

a. $\frac{3}{5}$ ____ c. 3 ____

b. $\frac{3}{10}$ ____ d. 3% ____

(1) 2. Write the word name for 4.37 _____

_____

(1) 3. Write "seventy-nine and three hundred forty-seven thousandths" as a decimal numeral.

_____

(1) 4. Arrange these in order from smallest to largest.
2.15, .215, .315, .351, .517

_____, _____, _____, _____, _____.

(3) 5. Round off 4.3175 to nearest:

a. tenth _____

b. hundredth _____

c. thousandth _____

(9) 6. Calculate.

a. 3.2 + .031 + 432.69 = _____

b. Add 4.06 + .89

c. Subtract 27.507 − 6.028

d. Multiply $\begin{array}{r} 6.89 \\ \underline{.045} \end{array}$

e. Multiply $\begin{array}{r} 5.42 \\ \underline{100.} \end{array}$

f. $5\overline{)3}$

g. $2.9\overline{)58}$

h. $.05\overline{)100}$

i. $52\overline{)7.80}$

(5) 7. Write as decimal numbers.

a. $\frac{1}{8} =$ _____

b. $2\frac{3}{5} =$ _____

c. $\frac{4}{5} =$ _____

d. $\frac{36}{24} =$ _____

e. $\frac{49}{56} =$ _____

(5) 8. Write as fractions in simplest form.

a. .375 _____

b. .125 _____

c. .7 _____

d. .42 _____

e. .65 _____

(1) 9. Write $5.60 in words. _____

_____

Problems: In the space below, show the work you do to solve problems. One mark is for your work, and one mark is for the correct answer.

(2) 10. Write the total money value of 1 five-dollar bill, 2 one-dollar bills, 2 quarters, 3 dimes and 2 pennies.

(2) 11. If you buy a package of cigarettes for 67 cents and pay for it with a dollar bill, in what combination of coins would you expect your change?

___ quarters, ___ dimes, ___ nickels, ___ pennies.

(2) 12. A man had the following work done on his car:

oil change	$4.60
grease job	$1.50
new head lamp	$2.35

What was the cost of all the work?

(2) 13. 18.5 gallons of gasoline cost $10.55. What is the cost per gallon to the nearest cent?

(2) 14. A test had 60 questions. If you got 45 questions correct, what decimal fraction of the questions did you have <u>wrong</u>?

Mathematics Unit Progress Test

UNIT IV: DECIMAL NUMBERS Name: _____

Form 2 Date: _____

Criterion:	35/ 39
Score:	___/___

(1) 1. .42 means (check one):

a. 4200 _____

b. $\frac{42}{100}$ _____

c. $\frac{42}{1000}$ _____

(1) 2. Write the word name for 12.3 _____

_____

(1) 3. Write "nine and thirty-three hundredths" as a decimal numeral. _____.

(1) 4. Arrange these in order from smallest to largest.
0.3, 30, .03, 3.0, .003

_____, _____, _____, _____, _____.

(3) 5. Round off 5.6354 to the nearest:

a. tenth _____

b. hundredth _____

c. thousandth _____

(9) 6. Calculate.

a. 6.0 + 42.65 + .005 + 100.6 = _____

b. Add $\begin{array}{r} 65.2 \\ \underline{9.72} \end{array}$

c. Subtract $\begin{array}{r} 49.6 \\ \underline{4.9} \end{array}$

d. Multiply $\begin{array}{r} 6.234 \\ \times\ .507 \\ \hline \end{array}$

g. Multiply $\begin{array}{r} 9.003 \\ \times\ .89 \\ \hline \end{array}$

e. $12\overline{)9}$

h. $15\overline{)7.5}$

f. $.06\overline{)36}$

i. $5.2\overline{)104}$

(5) 7. Write as decimal numbers.

a. $\frac{1}{5}$ = _____

d. $1\frac{3}{8}$ = _____

b. $\frac{3}{4}$ = _____

e. $\frac{1}{12}$ = _____

c. $\frac{36}{40}$ = _____

(5) 8. Write as fractions in simplest form.

a. .875 _____

d. .450 _____

b. 2.6 _____

e. .85 _____

c. .7 _____

(1) 9. Write $3.95 in words. _____

_____

Problems:- In the space below, show the work you do to solve problems. One mark is for your work, and one mark is for the correct answer.

(2) 10. What is the money value of 3 one-dollar bills, 1 quarter, 6 dimes and 1 nickel?

(2) 11. If you buy some tooth paste for 89 cents and a bar of soap at 35 cents, what combination of coins would you expect in change from $2.00?

(2) 12. Long distance telephone rates between two points are $.75 for the first 3 minutes and $.25 per minute after 3 minutes. How long can you talk in that case for $1.75?

(2) 13. A frying chicken was priced at $.39 per pound. If the chicken weighed 3 $\frac{1}{2}$ pounds, how much will it cost to the nearest cent?

(2) 14. At 10 pounds for $.55, how many pounds of potatoes can you buy for $2.20?

(2) 15. How deep is a pile of 132 sheets of metal if each sheet is .0625 inches thick?

Mathematics Diagnosis

UNIT V: PERCENT

NAME: _____

DATE: _____

OBJECTIVE

1. Write 5% in words. _____ A-1

2. Write seventy-two percent in symbols. _____ A-2

3. Does 62% mean 62 or $\frac{62}{100}$ or 6.2? Circle the correct answer. A-3

4. Write as decimals. A-4 A-8

   a. 80% _____

   b. 250% _____

   c. 67 $\frac{1}{2}$ % _____

   d. $\frac{1}{2}$ % _____

   e. 1% _____

5. Change to percents. A-5 A-8

   a. .75 _____

   b. .375 _____

   c. .005 _____

   d. 1.7 _____

   e. .33 _____

6. Change to common fractions and give answers in simplest form. A-6 A-8

   a. 5% _____

   b. 42% _____

   c. 70% _____

   d. 33 $\frac{1}{3}$ % _____

   e. 60% _____

OBJECTIVE

7. Change to percents.

a. $\frac{1}{2}$ _____ d. $\frac{13}{20}$ _____ A-7

b. $\frac{4}{5}$ _____ e. $\frac{47}{50}$ _____ A-8

c. $\frac{16}{25}$ _____

8. Calculate:

a. 5% of 30 = _____ d. 42% of 300 = _____

b. 10% of 250 = _____ e. 1.8% of 4200 = _____ B-1 a

c. 75% of 100 = _____

9. A family decided to save 5% of their income of $6,200 each year. How much did they plan to save? Show your work. B-1 a, B-2, D-1, D-2

10. Calculate:

a. 24 is ____% of 30 d. 40 is ____% of 50

b. 60 is ____% of 100 e. 18 is ____% of 90 B-1 b

c. 15 is ____% of 10

11. If you saved $20.00 of your $400.00 pay cheque, what percent did you save? Show your work. B-1 b, B-2, D-1, D-2

	OBJECTIVE
12. Calculate: a. 5% of ____ = 10 d. 18% of ____ = 360 b. 25% of ____ = 300 e. 150% of ____ = 600 c. 75% of ____ = 75	B-1 c
13. If you buy a coat for $15.00 which was on sale at 25% off, what was the regular price before the price reduction? Show your work.	D-1, D-2 B-1 c, B-2
14. A new stove was priced at $275.00. If a sales tax of 5% would be added, what is the cost including the tax? Show your work.	D-1, D-2 B-1 a, B-2
15. In a clearing out sale, a store advertised all goods at 25% off. What would you pay for a pair of shoes which were $24.80 before the sale? Show your work.	D-1, D-2 B-1 a, B-2
16. If you had earned $10.80 interest at 4% in one year, and had not added any money to your account during the year, how much money did you have in your account before the interest was added? Show your work.	B-1c B-2 D-1 D-2

		OBJECTIVE
17.	If you attended 72 out of 80 possible days in your training course, what percent did you attend? Show your work.	B-1 b, B-2 D-1 D-2
18	a. $\begin{array}{r} 2780 \\ +\ 199 \end{array}$ b. $\begin{array}{r} 406 \\ -\ 299 \end{array}$ c. $\begin{array}{r} 369 \\ \times\ 20 \end{array}$	C-1,
	d. $42\overline{)840}$ e. $2\frac{1}{4} + 5\frac{1}{8} - \frac{9}{16} =$ _____	C-1, C-2
	f. $2.9\overline{)46.9945}$ g. $\begin{array}{r} 2100 \\ \times 1.8 \end{array}$	C-3
	h. $\frac{3}{4} + .6 + 2.25 =$ _____	C-3

UNIT V: PERCENT

ITEM A: READING, WRITING AND EQUIVALENTS

OBJECTIVES

The student must be able to:

1. Read numbers in percent notation.
2. Use the symbol (%) correctly.
3. Identify a percent as a fraction with a denominator of 100.
4. Change percents to decimal numbers.
5. Change decimal numbers to percents.
6. Change percents to common fractions.
7. Change common fractions to percents.
8. State percent, decimal and common fraction equivalents of $\frac{1}{5}$, $\frac{1}{4}$, $\frac{1}{3}$, $\frac{1}{2}$, $\frac{2}{3}$, $\frac{3}{4}$ from memory.

LEARNING RESOURCES

Books: Basic Mathematics, Bouman and Lindsay
Mathematics, A Basic Course, Cambridge Book Company
Refresher Mathematics, Stein
Learning to Compute, Harcourt, Brace and World Inc.
General Mathematics, Ginn and Company

LEARNING ACTIVITIES

If you missed any of objectives 1, 2 or 3 on the Diagnosis, get a copy of Refresher Mathematics and read page 221. Then do the Diagnostic Test (all four questions). Check your answers to questions 1 and 3 in the back of the book, and questions 2 and 4 with another student or your instructor. Do sets in the "related practice examples" on page 222 which correspond to the questions you missed on the Diagnostic Test (for example, if you missed question 3, do set 3 as an exercise). Check your answers.

If you missed objective 4 on the Diagnosis, read page 223 and do the Diagnostic Test (odd numbers only). Check your answers. Do sets in the "related practice examples" on page 224 which correspond to the questions you missed on the Diagnostic Test. Check your answers.

If you missed objective 5 on the Diagnosis, read page 225 and do the Diagnostic Test (odd numbers only). Check your answers. Do sets in the "related practice examples" on page 226 which correspond to the questions you missed on the Diagnostic Test. Check your answers.

If you missed objective 6 on the Diagnosis, read page 227 and do the Diagnostic Test (all four questions). Check your answers to questions 1 and 3 in the back of the book and questions 2 and 4 with another student or your instructor. Do sets in the "related practice examples" on pages 227 and 228 which correspond to the questions you missed on the Diagnostic Test. Check your answers.

If you missed objective 7 on the Diagnosis, read page 229 and 230 and write the Diagnostic Test(odd numbers only). Check your answers. Do sets in the "related practice examples" on pages 230 and 231 which correspond to the questions you missed on the Diagnostic Test. Check your answers.

The information for objective 8 is found in the table on page 205.

If your work is correct to this stage, you are ready to write Item Progress Check V A, Form 1. If you need further assistance, use one or more of the following:

Objective	Source Materials	Page(s)	Content
1, 2	Basic Mathematics	249, 250	information & exercises
3, 7	"	251-254	"
6	"	254-256	"
4	"	264-265	"
5	"	265-266	"
1,2,3,6,7	Learning to Compute	101	"
4, 6	"	102	"
8	"	104	equivalents table
1,2,3	Mathematics, A Basic Course	105	information & exercises
4	"	106	"
6,8	"	107, 108	"
1 to 7	General Mathematics	354-358	"

After you have written Item Progress Check V A, Form 1, and have met the criterion, go on to the next Item as indicated on your Diagnosis. If you do not meet the criterion, select additional work from the table and, after completing it, write Item progress Check V A, Form 2. If you now meet the criterion, go on to the next Item shown on your Diagnosis. If not, see your instructor.

If you have now completed all the work in Unit V, you are ready to write Unit V Progress Test, Form 1. If you meet the criterion, look at Diagnosis VI for further instructions.

Mathematics Item Progress Check

UNIT V: PERCENT Name: _____

ITEM A: READING, WRITING AND EQUIVALENTS

Form 1 Date: _____

Criterion:	20 /20
Score:	___/___

(1) 1. Write the word name for the symbol 5%. _____

(1) 2. If you have a fraction with a denominator of 100 and write it without the denominator, you can then express the numerator as a

_____.

(1) 3. 8% means (check one).

$\frac{8}{100}$ ___, $\frac{80}{100}$ ___, $\frac{8}{10}$ ___, $\frac{1}{8}$ ___.

(1) 4. 100% of something means _____.

(4) 5. Change to decimal fractions.

a. 40% _____ c. 125% _____

b. $1\frac{1}{2}\%$ _____ d. 58% _____

(4) 6. Change to percents.

a. .56 _____ c. .075 _____

b. 1.27 _____ d. .875 _____

(4) 7. Change to common fractions or mixed numbers in simplest form.

a. 60% _____ c. 25% _____

b. $12\frac{1}{2}\%$ _____ d. 175% _____

(4) 8. Change to percents.

a. $\frac{2}{3}$ = _____ c. $\frac{21}{25}$ = _____

b. $\frac{1}{2}$ = _____ d. $1\frac{5}{8}$ = _____

Mathematics Item Progress Check

UNIT V: PERCENT Name: _____

ITEM A: READING, WRITING AND EQUIVALENTS Date: _____

Form 2

Criterion: 18 / 20
Score: ___/___

(1) 1. 5% means (check one):

$\frac{5}{10}$ _____, $\frac{5}{100}$ _____, $\frac{50}{100}$ _____, $\frac{1}{5}$ _____.

(1) 2. Write the word name for the symbol 60%. _____

(1) 3. Percent means (check one):

per 100 ___, 100 ___, $\frac{1}{100}$ ___, $\frac{1}{10}$ ___

(1) 4. 50% of something means (check one):

all of it ___, $\frac{1}{2}$ of it ___, 50 times it ___.

(4) 5. Change to decimal fractions.

a. 50% _____ c. 110% _____

b. $2\frac{3}{4}$% _____ d. 47% _____

(4) 6. Change to percents.

a. .32 _____ c. .025 _____

b. 2.35 _____ d. .625 _____

(4) 7. Change to common fractions or mixed numbers in simplest form.

a. 70% _____ c. 75% _____

b. $37\frac{1}{2}$% _____ d. 225% _____

(4) 8 Change to percents.

a. $\frac{1}{3}$ = _____ c. $\frac{31}{50}$ = _____

b. $1\frac{1}{4}$ = _____ d. $\frac{5}{8}$ = _____

MATHEMATICS

UNIT V: PERCENT

ITEM B: OPERATIONS

OBJECTIVES

The student must be able to:

1. Solve the three types of percent questions.

   a. finding a percent of a number.

      50% of 4 = ?

   b. finding what percent one number is of another.

      2 is ? % of 4.

   c. finding a number when a percent of it is given.

      50% of ? = 2

2. Solve word problems using the above three types.

LEARNING RESOURCES

Books: Basic Mathematics, Bouman and Lindsay
Mathematics, A Basic Course, Cambridge Book Company
Refresher Mathematics, Stein
Learning to Compute, Harcourt, Brace and World Inc.
General Mathematics, Ginn and Company

LEARNING ACTIVITIES

If you missed objective 1 a on the Diagnosis, get a copy of Refresher Mathematics and read pages 232 and 233. Then write the Diagnostic Test on page 233 doing only the odd numbered questions. Check your answers with those in the back of the book. Do sets in the "related practice examples" on pages 233 to 235 which correspond to the questions you missed on the Diagnostic Test (for example, if you missed question 3, do set 3 as an exercise). Check your answers.

If you missed objective 1 b on the Diagnosis, read page 240 and do the Diagnostic Test (odd numbers only) on page 241. Check your answers. Do sets in the "related practice examples" on pages 241 to 243 which correspond to the questions you missed on the Diagnostic Test. Check your answers.

If you missed objective 1 c on the Diagnosis, read pages 246 and 247 and do the Diagnostic Test (odd numbers only). Check your answers. Do sets in the "related practice examples" on pages 247 and 248, which correspond to the questions you missed on the Diagnostic Test. Check your answers.

If you missed objective 2 on the Diagnosis, do the following problems: page 235, question 1 and 3; page 236, question 11; page 244, question 3 and 5; and page 249, question 1, 3 and 5. Check your answers.

If your work is correct to this stage, you are ready to write Item Progress Check V B, Form 1. If you need further assistance, use one or more of the following:

Objective	Source Materials	Page(s)	Content
1	Basic Mathematics	256-268	information & exercises
1 a	Learning to Compute	103-107	"
1 b	"	108-110	"
1 c	"	111, 112	"
2	"	105, 106, 110, 112, 113	problems
1 a	Mathematics, A Basic Course	109	information & exercises
1 b	"	112, 113	"
1 c	"	116, 117	"
2	"	110, 113	problems
1 a	General Mathematics	360, 361	information & exercises
1 b	"	359, 360	"
1 c	"	362, 363	"
2	"	359-363	problems
1	"	364-365	information & exercises

After you have written Item Progress Check V B, Form 1, and have met the criterion, go on to the next Item as indicated on your Diagnosis. If you do not meet the criterion, select additional work from the above table and, after completing it, write Item Progress Check V B, Form 2. If you now meet the criterion, go on to the next Item shown on your Diagnosis. If not, see your Instructor.

If you have now completed all the work in Unit V, you are ready to write Unit V Progress Test, Form 1. If you meet the criterion, look at Diagnosis VI for further instructions.

Mathematics Item Progress Check

UNIT V: PERCENT

ITEM B: OPERATIONS

Form 1

Name: _____

Date: _____

Criterion: 15 / 15
Score: ___/___

(9) 1. Calculate the following.

a. 5% of 60 = _____

b. $1\frac{1}{2}$% of 75 = ___

c. 150% of 56 = ___

d. 24 is ___% of 30.

e. 75 is ___% of 150.

f. 120 is ___% of 80.

g. 10% of ___ = 20

h. 175% of ___ = 70

i. 20% of ___ = 55

Problems: In the space below, show the work you do to solve problems. One mark is for your work, and one mark is for the correct answer.

(2) 2. If you got 32 questions correct out of 40 on a test, what percent did you get correct?

(2) 3. How much interest would you earn for a year on $120 at interest of $3\frac{1}{2}\%$ per year?

(2) 4. A retailer bought a stove for $300 wholesale. If he wants to sell it at a price which will make this wholesale price 80% of the selling price, what price must he charge?

Mathematics Item Progress Check

UNIT V: PERCENT

ITEM B: OPERATIONS

Form 2

Name: _____

Date: _____

Criterion:	13 /15
Score:	___/___

(9) 1. Calculate the following.

a. 3% of 70 = ____

b. $3\frac{1}{2}$% of 125 = ____

c. 160% of 110 = ____

d. 64 is ___% of 80.

e. 75 is ____% of 1500.

f. 10 is ___% of 6.

g. 5% of ____ = 13.

h. $33\frac{1}{3}$% of ____ = 16

i. $\frac{1}{2}$% of ____ = 2.

Problems: In the space below, show the work you do to solve problems. One mark is for your work, and one mark is for the correct answer.

(2) 2. If you ate 8 oranges of a dozen (12), what percent did you eat?

(2) 3. A salesman works on a commission of 5%. If he sold $1,200 worth of goods, how much did he earn?

(2) 4. A pair of shoes are selling on sale for $24. Calculate the regular price of these shoes before they went on sale if the sale price is 75% of the regular price.

MATHEMATICS

UNIT V: PERCENT

ITEM C: COMPUTATION REVIEW

OBJECTIVES

The student must be able to:

1. Add, subtract, multiply, and divide whole numbers.
2. Add, subtract, multiply, and divide fractions.
3. Add, subtract, multiply and divide combinations of whole numbers, fractions, and decimal numbers.
4. Calculate percentages.

LEARNING RESOURCES

Books: Basic Mathematics, Bouman and Lindsay
Learning to Compute, Harcourt, Brace and World Inc.
Refresher Mathematics, Stein
General Mathematics, Ginn and Company

LEARNING ACTIVITIES

If you missed objective 1 on the Diagnosis, get a copy of Refresher Mathematics, turn to page 253 and do questions 1 to 6 in the "Keyed Achievement Test". Check your answers - odd numbers in the back of the book, even numbers with another student or your instructor. Then turn to the exercise indicated by the numbers written in blue beside any questions in which you made errors. Do some of these exercises for practice. Check your answers.

If you missed objective 2 on the Diagnosis, turn to page 253 and do questions 7 to 10 in the "Keyed Achievement Test". Using the method explained in the last paragraph, check your answers and do the necessary exercises as indicated by the blue numbers.

If you missed objective 3 on the Diagnosis, turn to page 253 and do questions 11 to 14 in the "Keyed Achievement Test". Using the method explained in the above paragraph, check your answers and do the necessary exercises as indicated by the blue numbers.'

If you missed objective 4 on the Diagnosis, turn to page 254 and do questions 15 to 20 at the top of the page. Using the method explained in the above paragraph, check your answers and do the necessary exercises as indicated by the blue numbers.

If your work is correct to this stage, you are ready to write Item Progress Check V C, Form 1. If you need further assistance, use one or more of the following:

Objective	Source Materials	Page(s)	Content
1	Basic Mathematics	20, 21	exercises (general)
1	"	48, 49	" (addition)
1	"	77, 78	" (multiplication)
1	"	106,107	" (subtraction)
1	"	132,133	" (division)
2	"	175-177	exercises
3	"	217-219	"
4	"	293	"
1	Learning To Compute	1-32	"
2	"	33-65	"
3	"	66-95	"
4	"	101-115	"
1,2,3,4	General Mathematics	52, 53, 83-85, 381	"

After you have written Item Progress Check V C, Form 1, and have met the criterion, go on to the next Item as indicated on your Diagnosis. If you do not meet the criterion, select additional work from the above table and, after completing it, write Item Progress Check V C, Form 2. If you now meet the criterion, go on to the next Item shown on your Diagnosis. If not, see your instructor.

If you have now completed all the work in Unit V, you are ready to write Unit V Progress Test, Form 1. If you meet the criterion, look at Diagnosis VI for further instructions.

Mathematics Item Progress Check

UNIT V: PERCENT Name: _____

ITEM C: COMPUTATION REVIEW Date: _____

Form 1

Criterion:	16 /16
Score:	___/___

(4) 1. Add.

a. $91 + 54 + 90 + 92 + 91 =$ _____

b. $\begin{array}{r} 100601 \\ \underline{\quad 5919} \end{array}$

c. $\begin{array}{r} 2.010 \\ .098 \\ \underline{23.91} \end{array}$

d. $5\frac{1}{8} + 4.25 + 3.0 =$ _____

(3) 2. Subtract.

a. $\begin{array}{r} 100601 \\ \underline{\quad 5919} \end{array}$

b. $\begin{array}{r} 10.998 \\ \underline{\quad .769} \end{array}$

c. $10\frac{1}{4} - 5.70 =$ _____

(3) 3. Multiply.

a. $22.5 \times (\frac{1}{3}$ of $18) =$ _____

b. $\begin{array}{r} 4.012 \\ \underline{\quad .05} \end{array}$

c. $\begin{array}{r} 560 \\ \underline{1\frac{1}{5}} \end{array}$

(3) 4. Divide (to 3 decimal places).

a. $15\overline{)0.03}$ b. $.17\overline{)5.20}$

c. $7\frac{5}{8} \div 2.25 =$ _____

(3) 5. a. 12 is what percent of 20? _____

b. 5% of 70 is _____

c. 20 is 5% of what number? _____

Mathematics Item Progress Check

UNIT V: PERCENT Name: _____

ITEM C: COMPUTATION REVIEW Date: _____

Form 2

Criterion:	14 /16
Score:	___/___

(4) 1. Add.

a. $76 + 42 + 30 + 96 + 49 =$ _____

b.
$$\begin{array}{r} 506115 \\ 2005 \\ \hline \end{array}$$

c.
$$\begin{array}{r} 56.019 \\ .399 \\ 42.563 \\ \hline \end{array}$$

d. $2\frac{1}{4} + 5.5 + 6.4 =$ _____

(3) 2. Subtract.

a.
$$\begin{array}{r} 506115 \\ 2006 \\ \hline \end{array}$$

b.
$$\begin{array}{r} 48.98 \\ 2.09 \\ \hline \end{array}$$

c. $15.75 - 4\frac{1}{4} =$ _____

(3) 3. Multiply.

a. $2\frac{1}{2} \times (\frac{1}{4}$ of $8) =$ _____

b.
$$\begin{array}{r} 56.55 \\ .01 \\ \hline \end{array}$$

c.
$$\begin{array}{r} 700 \\ 2\frac{1}{7} \\ \hline \end{array}$$

(3) 4. Divide (to 3 decimal places).

a. $6\overline{).2}$ b. $.05\overline{)1.05}$ c. $9 \div 4\frac{1}{4} =$

(3) 5. a. 32 is what percent of 60? _____

b. $1\frac{1}{2}$ % of 90 is _____.

c. 70 is 140% of what number? _____

MATHEMATICS

UNIT V: PERCENT

ITEM D: APPLIED PROBLEMS

OBJECTIVES

The student must be able to:

1. Apply the steps in solving a number problem - that is:

   a. Write what is to be found.

   b. Write a word sentence using given facts and telling what is to be found.

   c. Write a mathematical sentence in symbols using given facts and telling what is to be found.

   d. Solve the mathematical sentence. (calculate what is not known)

   e. Write the answer to the original problem.

2. Apply each or all of the above in solving a given problem.

LEARNING RESOURCES

Books: Learning to Compute, Harcourt, Brace and World Inc.
Refresher Mathematics, Stein
Mathematics, A Basic Course, Cambridge Book Company
General Mathematics, Ginn and Company

LEARNING ACTIVITIES

If you missed objective 1 or 2 on the Diagnosis, review the objectives listed on this sheet, get a copy of General Mathematics and read about "Developing Skill in Solving Problems" on pages 46 to 50. Look over the problems, but do not solve them. Then, using the methods described on pages 46 to 50, solve problems 1 and 3 in exercise 2-13 on page 51. Check your answers with those in the back of the book. Then do the following problems: page 359 questions 1 and 3; page 360, questions 6 and 7; page 361, questions 3 and 4; and page 363, question 2,4 and 7. Check your answers.

If your work is correct to this stage, you are ready to write Item Progress Check V D, Form 1. If you need further assistance, use one or more of the following:

Objective	Source Materials	Page(s)	Content
1,2	Learning to Compute	105, 106 110, 112, 113	problems
1,2	Refresher Mathematics	235, 244, 249	"
1,2	Mathematics, A Basic Course	110, 113, 117	"

After you have written Item Progress Check V D, Form 1, and have met the criterion, you are ready to write Unit V Progress Test, Form 1. If you meet the criterion on Unit V Progress Test, you are ready to look at Diagnosis VI for further instructions. If not, see your instructor.

If you do not meet the criterion on Item Progress Check V D, Form 1, select additional work from the above table and, after completing it, write Item Progress Check V D, Form 2. If you do not meet the criterion, see your instructor.

If you now meet the criterion, you are ready to write Unit V Progress Test, Form 1. If you meet the criterion on the Unit Test, look at Diagnosis VI for further information. If not, see your instructor.

Mathematics Item Progress Check

UNIT V: PERCENT Name: _____

ITEM D: APPLIED PROBLEMS Date: _____

Form 1

Criterion:	8 / 8
Score:	___/___

Problems: In the space below, show the work you do to solve problems. One mark is for your work, and one mark is for the correct answer.

---

(2) 1. 75% of the number of students in a class is 27. What is the total number in the class.

(2) 2. In 600 pounds of a certain grade of milk, there were 25.8 pounds of butterfat. What percent of the milk was butterfat?

(2) 3. A merchant decided that a profit of 15% of the buying price was required. If the merchant then bought a stove for 250 dollars, how much was the selling price?

(2) 4. J. M. Camp purchased a stove for $210.00 including a sales tax of 5%. How much did the stove cost without the tax?

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Mathematics Item Progress Check

UNIT V: PERCENT Name: _____

ITEM D: APPLIED PROBLEMS Date: _____

Form 2

Criterion:	6 / 8
Score:	___/___

Problems: In the space below, show the work you do to solve problems. One mark is for your work, and one mark is for the correct answer.

(2) 1. 80% of the distance between two cities is 144 miles. How far apart are the two cities?

(2) 2. A damaged hoist is capable of lifting 3,250 pounds. If this is only 65% efficient, how much should the hoist lift when repaired?

(2) 3. Bill Gurd noticed a sale sign reading "5 tires for $67.50". He decided to buy 2 tires for the front of his car. How much did he pay for them? (Add a 5% sales tax)

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(2) 4. Ms. Peter sold dry goods at one of the local stores. She was paid a commision of 40% of all goods sold. Recently a customer came in and ordered $350 worth of goods. How much did Ms. Peter earn from this sale?

Mathematics Unit Progress Test

UNIT V: PERCENT

Name: _____

Form 1

Date: _____

Criterion: 40/43
Score: ___/___

(1) 1. Write 5% in words. _____

(5) 2. Change to decimals.

a. 5% _____ d. $1\frac{1}{2}\%$ _____

b. 80% _____ e. 175% _____

c. $66\frac{2}{3}\%$ _____

(5) 3. Change to percents.

a. .42 _____ d. .002 _____

b. .04 _____ e. 1 _____

c. 2.34 _____

(5) 4. Change to fractions and give answers in simplest form.

a. $33\frac{1}{3}\%$ _____ d. $\frac{1}{2}\%$ _____

b. 140% _____ e. $5\frac{1}{2}\%$ _____

c. 68% _____

(5) 5. Change to percents.

a. $1\frac{1}{4}$ _____ d. $\frac{12}{25}$ _____

b. $\frac{2}{5}$ _____ e. $\frac{7}{8}$ _____

c. $\frac{1}{2}$ _____

(8) 6. Calculate.

a. 5% of 40 = ____ e. 60 is ___% of 50.

b. 125% of 8 = ____ f. 32 is ___% of 100.

c. $3\frac{1}{2}$% of 90 = ____ g. 10% of ____ = 40.

d. 20 is ___% of 30. h. 150% of ____ = 36.

(1) 7. What is the ratio of 20 to 8 (in simplest form)?

_____

(1) 8. If you get 40 out of 45 on a test, what is your ratio of wrong to right? (Give your answer in simplest form)

_____

(1) 9. Write the proportion in correct notation.
3 is to 4 as 15 is to 20.

_____

(2) 10. Put the missing number in the ( ).

a. $\frac{5}{6} = \frac{(\quad)}{36}$ b. $\frac{9}{3} = \frac{60}{(\quad)}$

(5) 11. Calculate.

a. .002 + 5.61 + $\frac{3}{4}$ = _____

b. Subtract $\begin{array}{r} 209 \\ \underline{91} \end{array}$ c. Multiply $\begin{array}{r} 42.05 \\ \underline{.20} \end{array}$

d. 210 ÷ $\frac{1}{4}$ = _____ e. $5.60 + $.89 = _____

Problems: In the space below, show the work you do to solve problems. One mark is for your work, and one mark is for the correct answer.

(2) 12. If a stove was reduced 25% because of fire damage and the original cost was $300.00, what is the new selling price?

(2) 13. A community organization purchased $600.00 worth of food for a sports day. They received a 4% discount on the first $250.00 of food and a 7% discount on the remainder. How much did they pay for the food?

Mathematics Unit Progress Test

UNIT V: PERCENT

Name: _____

Form 2

Date: _____

Criterion: 39 /43
Score: ___/___

(1) 1. Write 38% in words. _____

(5) 2. Change to decimals.

a. 6% _____ d. $1\frac{3}{4}\%$ _____

b. 90% _____ e. 230% _____

c. $33\frac{1}{3}\%$ _____

(5) 3. Change to percents.

a. .36 _____ d. .09 _____

b. .006 _____ e. 4 _____

c. 5.15 _____

(5) 4. Change to fractions and give answers in simplest form.

a. $66\frac{2}{3}\%$ _____ d. $6\frac{1}{4}\%$ _____

b. 25% _____ e. 43% _____

c. 260% _____

(5) 5. Change to percents.

a. $1\frac{1}{5}$ _____ d. $6\frac{1}{4}$ _____

b. $\frac{4}{5}$ _____ e. $\frac{1}{8}$ _____

c. $\frac{3}{4}$ _____

(8) 6. Calculate.

a. 6% of 90 = _____ e. 240 is ___% of 200.

b. 110% of 50 = _____ f. 26 is ___% of 100.

c. $3\frac{1}{2}$% of 75 = _____ g. 20% of ____ = 150.

d. 120 is ___% of 180. h. 175% of ____ = 140.

(1) 7. **What is the ratio of 12 to 15 in simplest form?**

_____

(1) 8. **If you spent $125 of a pay cheque of $150, what is the ratio of what you spent to the whole cheque? (Give answer in simplest form).**

_____

(1) 9. Give an example of a proportion. _____

(2) 10. Put the missing number in the ( ).

a. $\frac{7}{8} = \frac{(\quad)}{48}$ b. $\frac{13}{2} = \frac{39}{(\quad)}$

(5) 11. Calculate.

a. 426 + 2.605 = _____

b. Subtract $\begin{array}{r} 5006 \\ \underline{\quad\ 9} \end{array}$ c. Multiply $\begin{array}{r} 420 \\ \underline{\times\ 19} \end{array}$

d. 5 + 6.2 + $3\frac{3}{4}$ = _____ e. 560 ÷ $\frac{7}{10}$ = _____

Problems: In the space below, show the work you do to solve problems. One mark is for your work, and one mark is for the correct answer.

(2) 12. There were 48 students in an Adult Basic Education class. On one particular Friday only 32 attended. What per cent attended on that day, and what per cent were absent?

(2) 13. Mr. Cone, a salesman, received an 8% commission on $2,000.00 of stock that he sold. He deposited this money in the bank at $7\frac{3}{4}$ % interest. How much interest did he earn in one year?

UNIT VI - CONSUMER MATH

There is no Diagnosis for this unit. You start Consumer Math by taking the Objectives/Learning Activities sheet for the first Item (Item A) and learn each Objective by completing the materials as listed on the Learning Activities page. You may do this individually or in small groups. After learning all the information presented in the source materials, you write the Item Progress Check, Form I for that Item. Start with Item A. If you do not reach the criterion as stated, review the objectives you missed using other source material and discuss the objectives with a fellow student or your instructor. Then write the Item Progress Check, Form 2 for Item A. Use this method to complete Items A to F. Item G on the Metric System does not have any Item Progress Checks. The Objectives/Learning Activities sheet for Item G explains what to do. There is no Unit Progress Check for the Unit on Consumer Math.

MATHEMATICS

UNIT VI: CONSUMER MATH.

ITEM A : PAYROLL AND DEDUCTION

Do the work listed below for each objective and check off each step as you complete it.

OBJECTIVES

The student must be able to:

1. Understand the importance of money in our daily lives.
2. Define gross income as being the amount of money earned before deductions.
3. Calculate gross income given rate of pay (hourly, weekly, monthly, annually), overtime, tips, fees, commissions, etc.
4. Define net income as being the amount of money left after fixed deductions.
5. Calculate net income given the gross income and given the fixed and percent deductions. These could include income tax, Canada Pension, Unemployment Insurance, union dues, etc.

LEARNING RESOURCES

Books: B Math, Pitman
Refresher Mathematics, Stein

Booklets: Your Money Matters, Royal Bank of Canada
Payroll and Deduction, information sheet

Start by reading pages 1 to 9 in the booklet "Your Money Matters" for some general information about the money system. Then read the booklet on "Payroll and Deduction". The next step is to turn to page 259 in B-Math and read about "Payrolls" to the middle of page 261. Now do time cards for number 56 and 57 in exercise 12-1 on page 261. Check your answers. If you made an error on either time card, find out why and do more (up to number 63 on page 262) until you can do two correctly. (The correct answer for No. 58 is $155.81 and for No. 59 is $154.40.) Now read about piece work on pages 262-263 and do questions 1, 2, and 3 on page 263. Check your answers. Read about "Deductions from Earnings" on page 263 and 264 and do question 1 in exercise 12-3 on page 264. Check your answers. (The answers are 1(a) $1.32, 1(b) $1.35, 1(c) $1.31, 1(d) $1.35, 1(e) $1.34 and 1(f) $1.30) Continue reading from the middle of page 264 (Canada Pension Plan) to the bottom of page 266, and complete the tables for questions 1 and 2 in exercise 12-4 on page 267. (The answers for question 1 are: (a) $27.10, (b) $28.15, (c) $21.35, (d) $21.00, (e) $23.15, (f) $24.55, (g) $21.55 and (h) $18.00. For question 2, the answers are:

Em-ployee	Gross Earnings	Unemp. Ins.	C.P.P.	Total of (3) + (4)	Taxable Earnings (2) − (5)	Exemp-tions	Income Tax
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Smith	$144.00	1.30	2.38	3.68	140.32	$2,670	19.55
Jones	153.39	1.35	2.55	3.90	149.49	2,259	23.15
Brown	148.40	1.33	2.46	3.79	144.61	2,850	19.35
White	150.60	1.35	2.50	3.85	146.75	1,500	26.60
Black	158.50	1.35	2.65	4.00	154.50	1,920	27.40
Green	149.42	1.34	2.48	3.82	145.60	3,220	18.00

Read about "Other Deductions" near the bottom of page 267 to the bottom of page 269. Do question 1 Exercise 12-5 on page 270. (The correct answers for net pay are: March 6, $115.40; March 13, $118.22; March 20, $120.34; and March 27, $114.59.)

If all your work is correct to this stage, you are ready to write Item Progress Check VI A, Form 1. If you make the criterion, you are ready to go on to Unit VI, Item B.

If you do not make the criterion on the Item Progress Check, or if you have had difficulty with the above questions, read page 530 in Refresher Math and do exercise 3 a, b, c, and d on page 530. Then do question 5 on page 531. Check your answers. Read the top of page 532 and do questions 9, 13, and 15. Read about "Piece Work" on page 533 and answer questions 19 and 21. Read about "Commission and Bonuses" on page 533 and do questions 23, and on page 534, question 25.

Now check with your instructor and do Item Progress Check VI A, Form 2. If you meet the criterion, go on to Unit VI, Item B. If you do not, discuss your difficulties with your instructor.

REPRINTED FROM - YOUR MONEY MATTERS -THE ROYAL BANK OF CANADA

THE PLACE OF MONEY IN OUR SOCIETY

To understand the importance of money in our daily lives it is only necessary to imagine for a moment, what the world would be like without it. How would you be able to complete the simplest transaction, let us say, taking a bus ride, if there was no commonly agreed-upon medium of exchange called money?

You could of course offer the bus driver something of value in your possession, in exchange for the ride. Let us say you are prepared to give him the new knitted sweater your doting auntie has knitted for you. Perhaps he will accept it and let you board the bus. But then again, perhaps not. The sweater may not be the right size, or perhaps the colour doesn't suit him. He may already have more sweaters than he needs. He may not be partial to wearing sweaters. He may be highly allergic to wool. He may just be in an irritable, uncooperative mood on this particular morning. In any event, no deal. Too bad, you'll have to walk.

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Even if he accepts the sweater, and lets you ride with him, it can hardly be regarded as a satisfactory transaction. Considering the labour and the materials that have gone into the making of the sweater, and the long-term use it offers, you have obviously paid an excessive price for something as transitory as a bus ride.

But what if you don't even have any goods in your immediate possession that you could offer him? How then can you effect your entry into the bus? Well you could offer to exchange some of your labour, your time and services, for the bus ride. If you're an artisan of some sort, or a professional person, perhaps you can work something out. He may be in need of the kind of services you can provide. But the chances are that long before the two of you have figured out the exact amount of plumbing repairs, or legal advice, or medical treatment he should receive in exchange for the bus fare, you would both be trampled by the other people waiting to board the bus.

But as the barter system grew clumsy, it was gradually replaced by one in which value or wealth was represented by a set of symbols recognized everywhere—money. The counters, bills or coins eventually came to have little value in themselves, but they were recognized by everyone as representing value.

They still are, although our feelings today about money have become much more complicated than they were in earlier times.

On the one hand, the majority of us spend most of our working hours trying to earn a living. On the other, many of us resent what appears to be an overly materialistic way of life.

Like it or not, money cannot be shrugged off. It is still the most accepted measure of your worth. It is still an important recognition of your personal contribution to the community.

So, that LP you bought on the spur of the moment cost a slice of your life. How large a slice depends entirely on the kind of work you do, and how much you get paid doing it.

If you're a highly-qualified, expensively trained lawyer, it probably cost only a few minutes of your working time to buy that record. If, on the other hand, you've just started your first job at the minimum hourly rate, then you've got several hours of your life invested in that purchase.

It's worth thinking about.

THE EVOLUTION OF MONEY

Mankind did not always have the convenience of money. The intricate monetary system we know today, has developed gradually over the ages from very humble origins.

Man, the Self-Sufficient

At the very beginning of human history man did not have a system by which he could exchange one good for another, nor did he need one. In that very primitive stage of society's development, bare survival was the order of the day. Each man had to rely totally on himself to produce the goods he and his dependents needed in order to live. He fashioned his own tools and weapons, built his own shelter, hunted and foraged for his food, and made his own clothing from the hides of the game he killed, or from grasses, or leaves, or bark he plucked in the forest. He was self-sufficient, a jack of all trades, and a master of none.

But as human society prospered beyond the level of mere subsistence, men began to find themselves in possession of more goods than they needed for immediate purposes of survival. What to do with this surplus grain, or these surplus hides or stone-axes? It was inevitable that the day would arrive when two men would realize simultaneously that each could benefit by giving up some of one good, in exchange for some of another. With this simple recognition, the barter system came into being.

The Barter System

Under the barter system, people swapped things that they had for things that they needed or wanted—my pig for your wheat, my clay pots for your homespun cloth, my arrow heads...With the acceptance of the principle of barter, it became possible for human society to develop some simple form of specialization and division of labour. Now, instead of making everything he needed himself, a man could concentrate on a single skill or trade, farming, making weapons, or fashioning tools. Then he could exchange the fruits of his labour for the other things he needed.

On a simple level, barter didn't work too badly, but whenever large quantities of goods had to change hands, the system became very complicated and bothersome. If for example you were a potter and had accumulated a whole potting shed full of cooking utensils, it wasn't always an easy matter to find trading partners who wanted cooking utensils, and also had something you wanted. Also, it is difficult at best to figure out what is fair exchange in a swapping deal, and the more goods involved the more difficult it got, and the more time and energy was squandered in making these exhaustive calculations. Finally when large quantities of goods were involved, it was a laborious and cumbersome process to transport the goods themselves whenever a trade was effected.

As the barter system began to break down under its own weight, the stage was set for the appearance of commodity money.

Commodity Money

The logical next step in the development of economic man was the concept of commodity money, so called because the earliest forms of money, unlike our sophisticated currency of today, had a value in themselves. The appearance of commodity money cut through, with one clean stroke, all the complications that had begun to bedevil the barter system as trading transactions grew more and more unwieldy. The invention of commodity money provided for the first time, an objective, commonly-agreed-upon medium of exchange.

To begin a monetary system, it was only necessary to find one thing that everyone wanted, and call it money. Then everything else was priced in terms of the one thing called money.

The introduction of money into the economic scene greatly facilitated trade. Under the barter system no transaction could take place until two people came together who had exactly the goods to exchange that each of them wanted. Now, with money, only one person with goods was needed, and one who had money.

Also, since all goods were now traded in terms of money, it wasn't too hard to find out what other traders were paying. This helped to set price, and thereby cut down on the endless haggling over what the commodity was worth which was a characteristic of the barter system.

Primitive commodity money took many forms, and many of these forms were known to be still in existence as recently as the 1940s and 1950s. Using the criteria of universal demand and relative scarcity, each society evolved a currency appropriate to the environment. At one time or another, the following have been used as money around the world: wives, livestock, stones, shells, tusks, whale's teeth, beads, rice, wine, beer, tea, grain, slaves and wampum. In Canada, under French rule, the scarcity of coins led to the extensive use of furs and grains as money. And at one time, maple sugar was legal tender in Nova Scotia.

While it offered convenience, there were certain hazards involved in using commodity money: wives and slaves had to be fed and sheltered, thereby cutting into profits; beer and wine could sour; livestock could sicken and die.

Metal Coinage

Money, as we know it in Western society had its beginnings in the coins of the ancient Lydians, Assyrians and Persians. They developed the metal coinage which was the predominant form of European currency until the end of the Middle Ages.

In order to make a coin, metal ore had to be mined, smelted, and stamped into a recognizeable shape and size. There was a great demand for such currency because of its clear advantages over barter in facilitating the exchange of goods. The amount of skill and hard labour involved in creating coinage made it scarce. Therefore, it had value in its own right.

At first the value of money was tied to the value of the metal in the coins. This didn't last long. It soon occurred to some of the ancient kings that by simply letting the coins pass through their hands to the general public they were ignoring a valuable source of new revenue. They began to "clip" little pieces off the coins before they passed them on. The clipped coins had less precious metal in them, but they continued to circulate with the same named value. However it was only a matter of time before people began to balk at accepting this mutilated money at its designated value.

This resistance did not deter their rulers. They simply switched to mixing a certain proportion of non-precious metal with the pure gold or silver usually employed in making coins. Thus, alloyed coins made their appearance. The "clipping" was there, but it no longer showed. This practice became euphemistically known as "seignorage."

Paper Money

Of all the metals available for coinage, gold was the scarcest. Therefore, it was natural and inevitable that it became the most common and desirable form of money.

But gold in quantity is too heavy to carry around conveniently. Mankind was almost flung back full circle, to the awkwardness of the barter system. However, the goldsmiths came to the rescue. In addition to fashioning coins and other articles of value out of gold, they began to store their customers' gold for them. In return they provided their clients with a receipt. People soon realized that it made more sense, and was far easier, in any transaction, just to transfer the goldsmith's receipts, rather than get involved in the onerous labour of transferring the actual gold from buyer to seller.

This was the origin of paper bills used as currency.

It was only a matter of time before some perceptive goldsmith, seeing that his customers were dealing only in receipts, and rarely, if ever, touching the actual gold in his care, experienced a leap of the imagination. If no one ever removed their gold, he reasoned, what was there to prevent him from issuing receipts in excess of the value of the gold in his possession?

As it turned out, nothing. Our enterprising goldsmith had in fact, stumbled on the first principle of modern banking—which was that paper receipts themselves could be used as money.

Eventually, it became apparent that the issue of paper money had to be controlled, in order to keep the supply of money in some kind of relation to the production of goods and services.

With the development of the banking system it soon became obvious that even paper money, useful as it was, had its limitations as a medium of exchange. It was perfectly satisfactory when it came to relatively small transactions, but less so when huge amounts had to change hands constantly, as they do in modern economic society.

Deposit Money

Deposit money—had to come.

If all transactions were to be carried out with actual cash, the amount of paper money needed to make such a system work would be stupifying, as would be the expense of manufacturing this amount of money, and maintaining it in circulation in good condition. Add to that the risk and inconvenience of carrying about large quantities of cash in order to be able to conduct normal business, and the emergence of deposit money seems inevitable.

Under this system, people are given chequing accounts at banks when they deposit money in the form of cash and cheques. They then are entitled to issue cheques up to the amount of money they have on deposit. Sometimes, by special arrangement, they can even issue cheques in excess of that amount. This is called an overdraft, essentially a form of loan.

The most important money we have now, both in quantity and in terms of its extensive use in business, is the bank deposit. About 90 percent of all present day transactions are done by cheque, i.e., the authority to transfer funds from one deposit account to another. Last year in Canada such transactions amounted to $25 billion. In the same period, bank notes, i.e., dollars, ran a poor second with just over $3 billion in circulation in the hands of the public. Coins of all denominations in circulation amounted to an insignificant $476 million.

HOW CANADIANS MAKE THEIR MONEY

There are several ways to describe how Canadians make their money. Most Canadians—three out of four—work for someone else, and make their money in the form of wages and salaries. One in ten Canadians work for themselves. And the rest receive their incomes from investments, pensions, alimony or welfare.

Despite the apparent affluence of many Canadian families, there is a wide disparity of incomes. According to the Senate Committee on Poverty, one out of every five Canadian families lived below the "poverty line" in 1969. The poverty line is an arbitrarily defined income which divides the poor from the non-poor population.

YOUR MONEY

You can inherit it, win it, be given it, or find it lying in the street. But chances are, like most Canadians, you earn, or will earn your money the hard way, by working for it.

But getting paid is no longer just a simple matter of receiving so many dollars at the end of the week in exchange for so many hours work. Nowadays, particularly if you are a salary earner employed by a large company there are a variety of ways in which you may be compensated for your efforts.

Most firms now offer a dazzling array of "fringe" benefits to their employees, in addition to old-fashioned money, of course. These include group pension and insurance plans, profit-sharing schemes, discount buying privileges, extended vacations, and subsidized staff restaurants.

HOW YOU GET PAID

Most people earn their incomes by working for someone else. Of the almost 8 million Canadians who were employed in 1971, over 75 percent received their earnings in the form of wages or salaries.

To get an idea of how people get paid according to their occupations, and their job status, let us examine the pay structure of Acme Electric, a not untypical, but wholly fictitious Canadian company, engaged in the manufacture of electrical equipment.

Assembly Line Workers

At Acme, an assembly line worker in the main factory, puts in a standard 37½ hour work week. Any work he does beyond the 37½ hours counts as overtime and he gets paid a higher than normal, hourly rate for that. In addition, he is paid for certain statutory holidays, receives a certain amount of paid sick leave over the year, and is entitled to an annual vacation with pay, after a certain length of service, as stipulated by the Canada Labour Code. The longer he remains with the company, the longer is his annual paid holiday, up to a specified maximum.

As an assembly line worker, his wages are calculated on an hourly basis. However, he and his colleagues collect their pay once a week, on Fridays.

When work is slack in Acme's plant, management may lay him off. Most companies operate their lay-off schedules by the rule of "last in, first out." So, a worker who has been with the company for quite a few years, is usually more secure than someone with only a few months' service.

Most production workers in manufacturing, construction, domestic, agricultural and service jobs are paid at an hourly rate. Part time work is usually paid this way too.

Office Personnel

People who work in offices, stores and banks—the clerical and sales personnel—are generally quoted a weekly salary. However they will most likely receive their pay every other week, or at the middle and end of each month.

The office workers at Acme may earn less than the men on the assembly line, particularly when overtime pay is counted, but they have more of a feeling of job-security. The office work week is 35 hours, but office personnel will often work extra hours without pay, to get a particular job done. On the other hand, if they are absent from work for half a day, owing to an emergency, they will probably not suffer a pay reduction.

All Acme office workers receive regular holidays and paid vacations. They are customarily given two weeks notice of dismissal, and in some cases receive severance pay when they leave.

Sales Staff

Acme Electric sells its products across Canada, under the direction of the Sales Manager. His salary is quoted in monthly or yearly terms and it is substantial. He is free to arrange his work schedule to suit himself, as long as he can deliver the goods. This may mean working late at night or on weekends, or taking to the road for days at a time.

Working under him, many of them on a straight commission basis, is a team of salesmen. The commission salesmen get a stated percentage of the dollar amounts of Acme products that they sell. They too are free to arrange their own work schedules. They are paid strictly on the basis of results.

Some salesmen, particularly those new to the company, operate with a drawing account. If say, they expect to make an average of $500 a month in commissions, they may draw perhaps $400 a month from the company, to tide them over until their sales are completed. A new salesman may work very hard at selling, for two or three months before any commission is due him. His "draw" is, in effect, an advance of commission which will be adjusted later, usually on a quarterly basis.

Management

Acme's management staff—the junior and senior executives, the department heads, and the president—manage the company, make the key policy decisions, and justify their annual salaries strictly by the success of the operations for which they are responsible.

The Rugged Individualists

While most Canadians work for companies more or less like Acme Electric, another substantial group, over half a million, are self-employed, either as small businessmen or as professionals.

A typical small business might be an electric repair shop run by a master electrician, who has the skill, the ambition and the capital to strike out on his own, rather than work for a large company. He locates his operation in a city suburb, sets up shop and hires a number of other electricians.

The idea of being in business for oneself has undeniable attractions. It offers the possibility of independence, and high gain.

However, running a small business is not without its pressures and hazards. Our master electricians must invest a considerable amount of money in equipment, tools and working materials in order to be ready to provide good service. He must pay his bills, meet a payroll which may include secretarial and maintenance help in addition to his electricians, and he must collect his charges for the work done by his firm. If he makes a mistake in estimating the costs of a job, it is he who will bear the loss. He must also draw out of the business a sufficient salary to meet his own personal expenses.

If there is anything left over at the end of the year, after all his accounts have been collected, and after all his obligations have been met, the profit is his. He may very well make some money, but there is a good chance he may not make any more than he would have received, without headaches, had he been working for someone else.

The master electrician's next door neighbour is also self-employed but on a more modest basis. A skilled typist, she operates a stenographic service from her apartment. She has invested in a good typewriter and a supply of stationery. For a fee she types theses for students, reports for small companies, manuscripts for authors. Her overhead is very small, so most of what she makes goes into her own pocket.

Professional people such as lawyers, doctors, architects, dentists are also counted among the self-employed. So are independent store owners, restaurant proprietors, and franchise holders and licensees such as gas station operators.

These then, are the basic ways in which most of us earn and receive our money.

However no matter how much or how often you may get paid, one thing is certain—You will not be able to keep all of the money you make.

YOUR PAYROLL DEDUCTIONS

Many large companies now use an automated method of handling the payroll. They do not distribute individual cheques, or pay-packets to their employees. Instead the money is deposited directly into the employees' personal bank accounts. This may lack some of the satisfaction of receiving cash in your hand, but it saves a great deal of time all around.

If the company you work for, does use this modern system, the only thing you'll receive in your hand on pay-day is a Statement of Earnings and Deductions. It will probably look something like this:

If you are paid by individual cheque, you will find most of this same information on the stub you are asked to detach before depositing your money in the bank.

If you are paid in cash, not unusual for many who are working by the hour, you should receive in your pay packet, a slip of paper, stating exactly what deductions have been made.

Your pay, by law, is subject to certain deductions. Other deductions are made with your assent. In all cases you should know how much is being deducted for each purpose, and why.

Checking Out Your Deductions

The first figure you'll probably see is your Net Pay. This is the amount that has been deposited in your bank, or placed in your hands. If the figure isn't exactly what you expected, then the explanation should be on your statement or stub.

Have you had an advance? Did you just get a raise? Has your Canada Savings Bond been paid up? Did you pledge a contribution to charity?

Any of these circumstances will affect the sum of money that you finally receive on pay-day.

If you have examined the statement or stub carefully, and you still don't know how your employers arrived at your Net Pay figure, then take the matter up with the payroll department. There could be an error somewhere. In any event it should be simple to get an explanation for any discrepancy.

It's a good idea to keep your statements, stubs and/or slips for at least a year, until you have paid your income tax. You will likely need these records when you file your return.

HOW TO READ A PAY SLIP

DEPT SER.	NAME OF EMPLOYEE NOM DE L'EMPLOYÉ	SOCIAL INS. NO (1) NO. D'ASS. SOCIALE	PERIOD ENDING MO DA YR (2) MO JR AN PÉRIODE AU

ACCOUNT NO (3) NO DE COMPTE	REGULAR (4) SALAIRE NORMAL	OVERTIME (5) SALAIRE SUPPL.	SPECIAL (6) SALAIRE SPÉCIAL	GROSS PAY (7) SALAIRE BRUT	TOTAL DEDUCT (8) TOTAL-DÉDUC.	NET PAY (9) SALAIRE NET

FED. TAX (10) IMPÔT FÉD.	PROV. TAX (11) IMPÔT PROV.	GOV. PENS (12) RENTES-GOUV.	PENSION FUND (13) C/RETRAITE	CHARITY (14) DONS	U.I.C. (15) ASS.-CHÔM.	BONDS (16) OBLIGATIONS	MISC. A AUTRES-A	MISC. B AUTRES-B

GROUP A & S (17) ASS. A/M	GROUP LIFE (18) ASS.-V.E.	ACC. INS. (19) ASS.-ACC.	PROV. HOSP. (20) ASS. HOSP.	MEDICARE (21) MEDICARE	ADVANCE (22) AVANCE	WKS U.I.C. (23) SEM. ASS.-CHÔM.	YEAR TO DATE BONDS OBLIGATIONS CUM.-ANNÉE	MEDICARE MEDICARE

GROSS PAY SALAIRE BRUT	FED. TAX IMPÔT FÉD.	PROV. TAX IMPÔT PROV.	GOV. PENS. RENTES.-GOUV.	PENSION FUND C/RETRAITE	CHARITY DONS	OVERTIME SALAIRE SUPPL.	QTR TO DATE PENSION FUND C/RETRAITE CUM.-TRIM.

STATEMENT OF EARNINGS AND DEDUCTIONS

RELEVÉ — SALAIRE ET DÉDUCTIONS

080

1 Social Insurance Number

Every working Canadian needs one, and anyone over 15 can get one by applying to the nearest Unemployment Insurance Commission Office.

The story of the SIN is published by the Queen's Printer or obtainable from any UIC office.

2 Period Ending

Shows the pay period – one week, ending on the date shown, two weeks, one month, etc.

3 Account Number

The employee's personal bank account number, if this pay is automatically deposited into the bank.

4 Regular

The full amount of pay, before deductions for the pay period.

5 Overtime

The amount of overtime pay, if any.

6 Special

Salary adjustments, like retroactive pay increase, if any.

7 Gross Pay

The sum of No. 4, 5, and 6.

8 Total Deductions

The sum of No. 10, through 22.

9 Net Pay

The amount that is actually paid to the employee.

10 Federal Tax

Must, by law, be deducted.

11 Provincial Tax

If any.

12 Government Pension Plan

Compulsory deduction of 1.8 percent of salary, maximum $84.60 per year.

Don't confuse this with Old Age Security. You'll get that too.

13 Pension Fund

Company's own pension fund, to which contributions may or may not be compulsory.

Legislation affecting payroll deductions is constantly being revised. It is worth watching out for this kind of news, since it also affects your pocketbook.

14 Charity

Donations pledged, if any.

15 U.I.C.

Unemployment insurance contribution, compulsory.

16 Bonds

Canada Savings Bonds instalment payments, if any.

17 Group A & S

Accident and sickness insurance, if any.

18 Group Life

Life insurance contribution, if any.

19 Accident Insurance

If any.

20 Provincial Hospitalization Plan

If any.

21 Medicare

Compulsory.

22 Advance

Salary advance, if any.

23 Year to Date

Figures reflect total earnings and deductions for the various listed items relative to the date shown on the pay slip.

Mathematics Item Progress Check

UNIT VI: CONSUMER MATH Name: _____

ITEM A : PAYROLL AND DEDUCTION Date: _____

Form 1

Criterion:	18/ 20
Score:	___/___

Problems: In the space below, show the work you do to solve problems. One mark is for your work, and one mark is for the correct answer.

(2) 1. Calculate the take home pay, or net income, in this situation.

Hours worked	40 hours
Pay rate per hour	$ 2.60
Income Tax deducted at	15%
Pension plan deducted at	1.8%
Unemployment insurance	$1.58
Union dues	$2.00

(2) 2. Mr. Williams earns $3.10 per hour for the first 40 hours each week and time and a half for any overtime. Calculate his earnings before any deductions for a week in which he worked 48 hours.

(2) 3. A furniture sales lady makes a salary of $400. per month plus a commission of 5% on all sales over $2,000. If she sold $3,600 worth of furniture in January, calculate her gross earnings.

(1) 4. Define net income _____

_____

(1) 5. Define gross income _____

_____

(2) 6. Jim Powers is a truck driver. His payroll number is 6758 and his Social Insurance number is 704 057 797. The regular rate of pay is $4.00 and his overtime rate is time and one half. He worked Monday to Friday from 9:00 a.m. to 5:00 p.m. and had one hour for lunch for which he is not paid. On Monday, Wednesday and Friday he worked overtime from 6:00 p.m. to 9:00 p.m. His deductions were: income tax $49.38, Unemployment Insurance $.98, Canada Pension $2.50. Fill out his time card and find Jim's take-home pay for the week. (Card on next page)

Employee Name				Payroll Number			
Social Ins. No.		Occupation		Hourly Rate of Pay			
Morning		Afternoon		Total Hours	Overtime		Total Hours
In	Out	In	Out		In	Out	
Signature		Total Hours Regular			Total Hours Overtime		

Deductions			Regular Pay		
Income Tax			Overtime Pay		
Unemployment Ins.			Total Pay		
Canada Pension			Total Deductions		
Total Deductions			Take-Home Pay		

(10) 7. Circle the best answer for each of the following:

1. Inflation means -

   a. your standard of living will go down
   b. the money you have will buy less
   c. the value of your money will increase
   d. you will earn more money

2. The earliest form of money was -

   a. gold
   b. deposit money
   c. the barter system
   d. paper money

3. The average income in Canada is approximately -

   a. $ 4,173
   b. $ 5,342
   c. $ 8,698
   d. $12,974

4. What percentage of Canadians are self-employed?

   a. 5%
   b. 10%
   c. 20%
   d. 30%

5. What percent of Canadians obtain their money from wages and salaries?

   a. 25%
   b. 50%
   c. 75%
   d. 100%

6. All employees must contribute to the -

   a. union dues
   b. group insurance
   c. Canada Pension Plan
   d. B.C. Hospitalization Plan

7. Gross earnings can be based on -

   a. salary (weekly, monthly or yearly)
   b. hourly wage rates
   c. piecework rates
   d. all of the above

8. Industrial firms usually base overtime and lateness on -

   a. the actual time registered on the time clock
   b. quarter-hour periods
   c. the nearest half hour
   d. the nearest hour

9. An employee may wish to have as a deduction -

   a. unemployment insurance
   b. Canada Pension Plan
   c. income tax
   d. bonds

10. The minimum vacation pay allowance is what percentage of the wages received by the employee during the working year -

   a. 0%
   b. 4%
   c. 8%
   d. 15%

Mathematics Item Progress Check

UNIT VI: CONSUMER MATH. Name: _____

ITEM A : PAYROLL AND DEDUCTION Date: _____

Form 2

Criterion:	17/20
Score:	___/___

Problems: In the space below, show the work you do to solve problems. One mark is for your work, and one mark is for the correct answer.

(2) 1. Bill Stephens works for a weekly salary of $150. He gets paid every second Friday. Calculate the amount of his pay cheque if he is deducted 15% for income tax, 1.8% for Canada Pension Plan, $1.90 per week for Unemployment Insurance, and has $1.00 per week deducted United Appeal.

(2) 2. Mr. Paul earns $28.00 per day. He qualifies for 1 1/4 days of holidays for each month he works. At the end of 6 months he resigns from his job and has not taken any holidays. Calculate the holiday pay he earned.

(2) 3. Define gross income _____

_____

(2) 4. Define net income _____

_____

(5) 5. A waitress earns a salary of $360.00 per month and received $57.00 in tips for the month of February. If her regular salary is $2.20 per hour and she also worked 15 hours overtime at time and a half, what are her gross earnings for February?

(2) 6. Lynn Taylor is a punch operator at a local factory. Her payroll number is 86302 and her Social Insurance number is 704 574 866. The regular rate of pay is $3.40 and her overtime rate is at time and one half. She worked Monday to Friday from 8:30 to 4:00 with one half hour for lunch for which she is not paid. On Tuesday and Thursday she worked overtime from 5:00 to 7:00. Her deductions were: income tax $35.80, Unemployment Insurance $.92, Canada Pension $2.25. Fill out her time card and find Lynn's take home pay for the week. (Card on next page)

Employee Name				Payroll Number			
Social Ins. No.		Occupation			Hourly Rate of Pay		
Morning		Afternoon		Total Hours	Overtime		Total Hours
In	Out	In	Out		In	Out	
Signature		Total Hours Regular			Total Hours Overtime		

Deductions			Regular Pay		
Income Tax			Overtime Pay		
Unemployment Ins.			Total Pay		
Canada Pension			Total Deductions		
Total Deductions			Take-Home Pay		

(10) 7. Circle the best answer for each of the following:

1. Inflation means -

   a. your standard of living will go down
   b. the money you have will buy less
   c. the value of your money will increase
   d. you will earn more money

2. The earliest form of money was -

   a. gold
   b. deposit money
   c. the barter system
   d. paper money

3. The average income in Canada is approximately -

   a. $ 4,177
   b. $ 5,342
   c. $ 8,698
   d. $12,974

4. What percentage of Canadians are self-employed?

   a. 5%
   b. 10%
   c. 20%
   d. 30%

5. What percent of Canadians obtain their money from wages and salaries?

   a. 25%
   b. 50%
   c. 75%
   d. 100%

6. All employees must contribute to the -

   a. union dues
   b. group insurance
   c. Canada Pension Plan
   d. B.C. Hospitalization Plan

7. Gross earnings can be based on -

a. salary (weekly, monthly or yearly)
b. hourly wage rates
c. piecework rates
d. all of the above

8. Industrial firms usually base overtime and lateness on -

a. the actual time registered on the time clock
b. quarter-hour periods
c. the nearest half hour
d. the nearest hour

9. An employee may wish to have as a deduction -

a. unemployment insurance
b. Canada Pension Plan
c. income tax
d. bonds

10. The minimum vacation pay allowance is what percentage of the wages received by the employee during the working year. -

a. 0 %
b. 4 %
c. 8 %
d. 15 %

MATHEMATICS

UNIT VI: CONSUMER MATH.

ITEM B : INCOME TAX

Do the work listed below for each objective and check off each step as you complete it.

OBJECTIVES

The student must be able to:

1. Calculate the following, referring to the T-1 tax form and tax guide:

   a) total income
   b) total deductions
   c) total personal exemptions
   d) taxable income
   e) federal and provincial tax

2. Fill out correctly a T-1 short tax form, given enough information.

LEARNING RESOURCES

Book: B Math, Pitman

Booklets: Income Tax, information sheet
Income Tax Guide, District Taxation Office
Individual Income Tax Return, District Taxation Office

LEARNING ACTIVITIES

Start by reading the information sheet on "Income Tax". Then turn to page 276 in B-Math and read to page 285. Do questions 1-a, b and 2-b, c, on page 286. Use the current Income Tax guide and obtain an Individual Income Tax Return to work out the above questions.

If all your work is correct to this stage, you are ready to write Item Progress Check VI B, Form 1. If you make the criterion, you are ready to go on to Unit VI, Item C.

If you do not make the criterion on the Item Progress Check, or if you have had difficulty with the above questions, re-read pages 276 to 285. Do questions 1-c, d and 2-a, e on pages 286 and 287. Use the current Income Tax guide and obtain an Individual Income Tax Return to work out the above questions. If you require further assistance, see your instructor or a fellow student. You are then ready to write Item Progress Check VI B, Form 2. If you meet the criterion, go on to Unit VI, Item C. If you do not, discuss your difficulties with your instructor.

INCOME TAX

REPRINTED FROM - YOUR MONEY MATTERS - THE ROYAL BANK OF CANADA

YOU AND YOUR INCOME TAX

In Canada, much of our direct taxation is arranged to be as painless as possible for those who work for a salary. As we have just noted, much of it is removed from our pay, even before we get our hands on it.

But our dealings with the tax man don't end there.

Every year, by April 30, every Canadian with an earned or unearned income of $1,600 (1972 figures) or more must file a federal tax return. Quebecers must in addition file a provincial tax return. Your tax returns list your income from all sources, and the tax exemptions to which you are legally entitled.

Why should it be necessary to file an income tax return when tax deductions have already been taken from your pay? Because no matter how carefully your deductions are worked out, it is unlikely that your year's deductions will exactly match what you should be paying to the federal and/or provincial governments. This is true even when your job is your only source of income, and you haven't earned an additional cent elsewhere.

You might have given more than $100 to charity last year. You could have acquired a non-working wife. Or had a child. You might have undertaken to support a relative. Perhaps you paid your first union dues. Any of these will change your tax status.

If any of these changes have occurred in your life, but your tax has been deducted at source at the same old rate, then you have certainly overpaid the taxman. You will then be able to apply on your tax form for a rebate.

If, during the year, you earned less than your basic deduction, but had your tax deducted while you were working, all the taxes you have paid will be refunded to you when you file your return.

If, on the other hand, you earned money in addition to your salary—by moonlighting, or interest on savings or investments, etc.—then you will most likely end up having to pay more taxes. If you are self employed and your income fluctuates you are required to make quarterly tax payments based on an estimate of your year's income. Then, at tax return time, you can adjust your payments by paying the outstanding balance, or by demanding a rebate, depending on how the year turned out.

The people in your local taxation office, both federal and provincial, are there to help you with any problems. Don't hesitate to use them.

You can also get help from professional consultants and accountants who will charge you for their services. Often, if your income statement is at all complicated, they may be able to save you more in tax than you pay them in fees by identifying relief you may overlook.

See the T-1 short tax form and tax guide for more information on income tax.

T - 4 INCOME TAX FORM

Used to show wages paid by employer and deductions for pension plans, income tax and unemployment insurance.

Revenue Canada Taxation / Revenu Canada Impôt

T4-1973
Supplementary – *Supplémentaire*

STATEMENT OF REMUNERATION PAID
ÉTAT DE LA RÉMUNÉRATION PAYÉE

•Keep this slip for your records
SEE INFORMATION ON REVERSE
•*Conserver pour vos dossiers*
VOIR LES RENSEIGNEMENTS AU VERSO

3

EMPLOYEE'S SURNAME FIRST, AND FULL ADDRESS
EMPLOYÉ(E) NOM DE FAMILLE D'ABORD, ET ADRESSE COMPLÈTE

1

(A) PROVINCE OF EMPLOYMENT / PROVINCE D'EMPLOI	(B) SOCIAL INSURANCE NUMBER / N° D'ASSURANCE SOCIALE	(K) EMPLOYEE NO. / N° DE L'EMPLOYÉ(E)

NAME AND ADDRESS OF EMPLOYER — *NOM ET ADRESSE DE L'EMPLOYEUR*

(C) TOTAL EARNINGS BEFORE DEDUCTIONS / GAINS TOTAUX AVANT DÉDUCTIONS	(D) EMPLOYEE'S PENSION CONTRIBUTION: CANADA PLAN / DU CANADA; QUEBEC PLAN / DU QUÉBEC — COTISATION DE PENSION (EMPLOYÉ)	(E) U.I. PREMIUM / PRIME D'A.-C.	(F) REGISTERED PENSION PLAN CONTRIBUTION / CONTRIBUTIONS RÉGIME ENREGISTRÉ DE PENSIONS	(G) INCOME TAX DEDUCTED / IMPÔT SUR LE REVENU DÉDUIT	(H) U.I. INSURABLE EARNINGS / GAINS ASSURABLES A.-C.	(I) U.I. PREM. RATE / TAUX DE PRIME D'A.-C.	(J) C.P.P. CONTRIBUTORY EARNINGS * / GAINS COTISABLES POUR R.P.C. *
BOX (C) AMOUNT INCLUDES ANY AMOUNTS IN BOXES (H), (J), (L) AND (M) / LE MONTANT À LA CASE (C) COMPREND TOUS MONTANTS FIGURANT AUX CASES (H), (J), (L) ET (M)						%	

* If different from Box (C) / *S'ils sont différents de la Case (C)*

(L) TAXABLE ALLOWANCES AND BENEFITS / ALLOCATIONS ET PRESTATIONS IMPOSABLES	(M) COMMISSIONS / COMMISSIONS	(N) PENSION PLAN REGISTRATION NUMBER / N° D'ENREGISTREMENT DU RÉGIME DE PENSIONS

395 76

- **Box (B) "Social Insurance Number"** — If this number is not the same as the number on your Social Insurance Number Card, advise your employer to correct his records.
- **Box (C) "Total Earnings Before Deductions"** is the amount to be reported on your Income Tax Return as your income from employment. This amount includes any amounts of remuneration shown separately in Boxes (H), (J), (L) and (M).
- **Box (D) "Employee's Pension Contribution"** is the amount deducted by your employer as your contribution to the Canada Pension Plan or the Quebec Pension Plan.
- **Box (E) "U.I. (Unemployment Insurance) Premium"** is the amount deducted by your employer as your premium for Unemployment Insurance.
- **Box (F) "Registered Pension Plan Contribution"** is the amount deducted as your contribution to your employer's pension plan.
- **Box (G) "Income Tax Deducted"** includes federal and provincial income tax deducted except in the case of the Province of Quebec which collects its provincial income tax separately.
- **Box (H) "U.I. Insurable Earnings"** is the amount of earnings from this employer on which your Unemployment Insurance premium was calculated.
- **Box (I) "U.I. Prem. Rate"** is the rate (percentage of your insurable earnings) at which your premium for Unemployment Insurance was deducted.
- **Box (J) "C.P.P. Contributory Earnings"** is the amount of your contributory earnings for purposes of the Canada Pension Plan. If there is no entry in this box (and you were employed in a place other than the Province of Quebec) the amount of your "contributory earnings" is the same as the amount shown in Box (C) or $5,600, whichever is less.
- **If you are taxable, you must file an Income Tax Return by the 30th April, 1974, and attach thereto copy 2 of each of your T4 Supplementary slips for the year 1973. If you are entitled to a refund of tax deducted or a refund of Canada Pension Plan [illegible] Unemployment Insurance overpayment, you may claim that refund on your Income Tax Return for the year [illegible] the appropriate [illegible]**

- **Case (B) « Numéro d'assurance sociale »** — Si ce numéro n'est pas le même que celui de votre carte matricule d'assurance sociale, veuillez demander à votre employeur de corriger ses dossiers.
- **Case (C) « Gains totaux avant déductions »** est le montant que vous devez signaler dans votre déclaration d'impôt sur le revenu comme revenu de votre emploi. Ce montant comprend tous les montants de rémunération indiqués séparément aux cases (H), (J), (L) et (M).
- **Case (D) « Cotisation de pension (employé) »** est le montant déduit par votre employeur au titre de vos cotisations sous l'empire du Régime de pensions du Canada ou du Régime de rentes du Québec.
- **Case (E) « Prime d'A.-C. » (Assurance-chômage)** est le montant de votre prime d'assurance-chômage déduit par votre employeur.
- **Case (F) « Contributions: régime enregistré de pensions »** est le montant déduit au titre de la caisse de pension de votre employeur.
- **Case (G) « Impôt sur le revenu déduit »** comprend l'impôt fédéral et provincial déduit sauf pour la province de Québec, qui perçoit séparément son impôt provincial sur le revenu.
- **Case (H) « Gains assurables: A.-C. »** est le montant des gains provenant de cet employeur sur lesquels votre prime d'assurance-chômage a été calculée.
- **Case (I) « Taux de prime d'A.-C. »** est le taux (pourcentage de vos gains assurables) selon lequel votre prime d'assurance-chômage a été déduite.
- **Case (J) « Gains cotisables pour R.P.C. »** est le montant de vos gains cotisables aux fins du Régime de pensions du Canada. S'il n'y a rien d'inscrit dans cette case (et si vous étiez employé ailleurs que dans la province de Québec), le montant de vos gains cotisables est le même que le montant indiqué à la case (C) ou $5,600, en prenant le moins élevé des deux.
- **Si vous êtes imposable, vous devez produire votre déclaration d'impôt sur le revenu au plus tard le 30 avril 1974, et y joindre la copie 2 de chacun de vos feuillets T4 Supplémentaire pour l'année 1973. Si vous avez droit à un remboursement d'impôt déduit ou au remboursement d'un trop-perçu de cotisations du Régime de pensions du Canada ou de primes d'assurance-chômage, veuillez demander ce remboursement [illegible] votre déclaration d'impôt sur le revenu [illegible] l'année [illegible].**

Mathematics Item Progress Check

UNIT VI: CONSUMER MATH

ITEM B: INCOME TAX

Form 1

Name: _____

Date: _____

Criterion:	12/ 15
Score:	___/___

(5) 1. Ask for a current Individual Income Tax Return form and tax guide. Fill out the tax form given the following information.

Revenue Canada Taxation / Revenu Canada Impôt

T4-1973
Supplementary — *Supplémentaire*

STATEMENT OF REMUNERATION PAID
ÉTAT DE LA RÉMUNÉRATION PAYÉE

•Attach to your 1973 Income Tax Return
SEE INFORMATION ON REVERSE
•*Annexer à votre déclaration d'impôt sur le revenu de 1973*
VOIR LES RENSEIGNEMENTS AU VERSO

2

EMPLOYEE: SURNAME FIRST, AND FULL ADDRESS
EMPLOYÉ: NOM DE FAMILLE D'ABORD, ET ADRESSE COMPLÈTE

Smith, Mr. Jim W.,
4753 West 17th Ave.,
Vancouver, B.C.
V6R 3P7

(A) PROVINCE OF EMPLOYMENT	(B) SOCIAL INSURANCE NUMBER	(K) EMPLOYEE NO.
B.C.	704 219 307	1875

NAME AND ADDRESS OF EMPLOYER — NOM ET ADRESSE DE L'EMPLOYEUR

Ace Manufacturing Co.,
423 Rush Street,
Vancouver, B.C.
V6D 1C5

(C) TOTAL EARNINGS BEFORE DEDUCTIONS	(D) EMPLOYEE'S PENSION CONTRIBUTION CANADA PLAN / QUEBEC PLAN	(E) U.I. PREMIUM	(F) REGISTERED PENSION PLAN CONTRIBUTION	(G) INCOME TAX DEDUCTED	(H) U.I. INSURABLE EARNINGS	(I) U.I. PREM. RATE	(J) C.P.P. CONTRIBUTORY EARNINGS *
8350.00	90.00	83.20		1053.21	8320.00	1	5600.00

(L) TAXABLE ALLOWANCES AND BENEFITS	(M) COMMISSIONS	(N) PENSION PLAN REGISTRATION NUMBER

* If different from Box (C)
* Si différents de la Case (C)

Revenue Canada Taxation — Revenu Canada Impôt

STATEMENT OF REMUNERATION PAID
ÉTAT DE LA RÉMUNÉRATION PAYÉE

•Attach to your 1973 Income Tax Return
SEE INFORMATION ON REVERSE
•*Annexer à votre déclaration d'impôt sur le revenu de 1973*
VOIR LES RENSEIGNEMENTS AU VERSO

T4-1973
Supplementary — *Supplémentaire*

2

EMPLOYEE: SURNAME FIRST, AND FULL ADDRESS
EMPLOYÉ: NOM DE FAMILLE D'ABORD, ET ADRESSE COMPLÈTE

Smith, Mr. Jim W.,
4753 West 17th Ave.,
Vancouver, B.C.
V6R 3P7

(A) PROVINCE OF EMPLOYMENT / PROVINCE D'EMPLOI	(B) SOCIAL INSURANCE NUMBER / N° D'ASSURANCE SOCIALE	(K) EMPLOYEE NO. / N° DE L'EMPLOYÉ
B.C.	704 219 307	723

NAME AND ADDRESS OF EMPLOYER — NOM ET ADRESSE DE L'EMPLOYEUR

Green Top Cab Co.,
1206 West Georgia St.,
Vancouver, B.C.
V5J 1A2

(C) TOTAL EARNINGS BEFORE DEDUCTIONS / GAINS BRUTS AVANT DÉDUCTIONS	(D) EMPLOYEE'S PENSION CONTRIBUTION CANADA PLAN / DU CANADA	QUEBEC PLAN / DU QUÉBEC	(E) U.I. PREMIUM / PRIME D'A.-C.	(F) REGISTERED PENSION PLAN CONTRIBUTION / CONTRIBUTIONS RÉGIME ENREGISTRÉ DE PENSIONS	(G) INCOME TAX DEDUCTED / IMPÔT SUR LE REVENU DÉDUIT	(H) U.I. INSURABLE EARNINGS / GAINS ASSURABLES A.-C.	(I) U.I. PREM. RATE / TAUX DE PRIME D'A.	(J) C.P.P. CONTRIBUTORY EARNINGS * / GAINS COTISABLES POUR R.P.C. *
833 10					97 50			

BOX (C) AMOUNT INCLUDES ANY AMOUNTS IN BOXES (H), (I) AND (J) / LE MONTANT DE LA CASE (C) COMPREND TOUS MONTANTS FIGURANT AUX CASES (H), (I) ET (J)

(L) TAXABLE ALLOWANCES AND BENEFITS / ALLOCATIONS ET PRESTATIONS IMPOSABLES	(M) COMMISSIONS / COMMISSIONS	(N) PENSION PLAN REGISTRATION NUMBER / N° D'ENREGISTREMENT DU RÉGIME DE PENSIONS

* If different from Box (C) / *S'ils sont différents de la Case (C)*

Jim lives with his wife Mary (Social Insurance Number - 704 113 751) and two children (John aged 5, and Joan aged 7). He has lived at the same house for many years and has always filed a tax return. He was born on June 15, 1945 and is the only wage earner in the family. Jim is a welder and works full time for Ace Manufacturing Co., but sometimes drives a taxi on weekends for Green Top Cabs, (he received $17.50 in tips which he must declare as income). He also received $27.31 bank interest and paid $63.20 in union dues. Determine the amount of federal and provincial tax to be paid, and the amount of the balance still to be paid or refund claimed.

Revenue Canada Taxation | Revenu Canada Impôt

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1973 Individual Income Tax Return
(and Canada Pension Plan Return, if applicable)

Family or Last Name (Print)

Mr / Mrs / Miss

Usual First Name and Initials (Print)

Present Address (Print)

Number, Street and Apt. No., or P.O. Box No. or R.R. No.

City, Province, Postal Zone or Postal Code

Mailing Address (if different from above)

Is this your first Income Tax return? Yes ☐ No ☐

If 'No', state year for which last return filed. 19

Name on last return: same as above ☐ or

Address on last return: same as above ☐ or

♦ Social Insurance Number ● Date of Birth

As on your Social Insurance Number card — Day Month Year

♦ Province or Territory of Residence on 31st December 1973, was:

♦ If self-employed in 1973, state province in which business was located

Provide other information concerning self-employment on page 3

♦ As at 31st December 1973, I was:

1 ☐ Married to ◇ ●

2 ☐ A Widow(er)

3 ☐ Divorced

4 ☐ Separated

5 ☐ Single

Usual First Name of Spouse

whose address is: same as mine ☐ or

Spouse's Social Insurance Number

♦ If you became or ceased to be a resident of Canada in 1973, give:

Date of Entry (See Guide—item 37) Day Month or Departure Day Month

Type of work or occupation in 1973

Name of present employer

Summary of Tax and Credits

There are two methods of tax calculation:
(1) Tax Table (2) Detailed
To determine which method you should use, see Guide—page 30.

Note: If using Detailed method, complete the following lines, if applicable:

Tax Adjustments 52 53 $ •

Income or Profits Tax paid to a foreign country 54 $ •

Net foreign income 55 $

Please do not use this area

56 •
57
58
59
60
61
62
63
64

Taxable Income from line 44 on page 2 $ | $ c

Federal Tax Payable	45	
Provincial Tax Payable (Except Quebec)	46	
Total Tax Payable	♦	•
Add: Canada Pension Plan Contribution Payable on Self-Employed Earnings (from page 3)	47	•
Total Payable		◇
Total tax deducted per information slips	♦	94 •
Canada Pension Plan Overpayment (from page 3)	48	•
Unemployment Insurance Overpayment (from page 3)	50	○ •
Amounts paid by instalments (Tax and C.P.P.)	51	•
Total Credits		◇
Enter this difference in applicable space below		

A difference of less than $1.00 is neither charged nor refunded.

Refund 1 •

Detach the refund sticker from the cover of the Schedules and place it over the postal code printed on the return envelope.

Balance Due 2 •

Amount Enclosed •

Attach cheque or money order **payable to Receiver General for Canada. Do not mail cash.** Payment is due not later than 30th April, 1974.

Name and address of the individual or firm, other than the taxpayer, who has prepared this return for compensation.

Name

Address

Telephone

I hereby certify that the information given in this return and in any documents attached is true, correct and complete in every respect and fully discloses my income from all sources.

Sign here

Date Telephone

It is a serious offence to make a false return.

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2 Summary of Income and Deductions

			$	¢
Income from Employment	Total Earnings Before Deductions per Box C on all T4 slips (attach copy 2 of T4 slips)	01		
	Commissions per Box M on all T4 slips, included in above total	02		
	Adult training allowances, not research grants, tips and gratuities (see Guide—item 3 and specify)	03		
	Total employment earnings (total of lines 01 and 03)	04		
	Deduct: 3% of 'Total employment earnings' (line 04 above)—maximum $150 (see Guide—item 4)	05		
	Other allowable expenses (see Guide—item 5 and specify)	06		
	Total employment expenses (total of lines 05 and 06)	07		
	Net employment earnings (line 04 less line 07)	08		
Pension Income	Old Age Security Pension ($1164.54 for year—for less than year, see Guide—item 6)	09		
	Canada or Quebec Pension Plan benefits (attach copy 2 of T4A (P) slip)	10		
	Other pensions or superannuation (attach copy 3 of T4A slips)	11		
Income from Other Sources	Unemployment Insurance benefits (attach copy 1 of T4U slip)	12		
	Taxable amount of dividends from taxable Canadian corporations (attach completed Schedule 4)	13		
	Interest and other investment income (attach list or completed Schedule 4)	14		
	Rental income (Schedule 7) Gross 15	Net 16		
	Net income from self-employment (complete applicable lines 69 to 79 on page 4)	17		
	Taxable capital gains or allowable capital losses (complete and attach Schedule 2)	18		
	Other income (see Guide—item 16 and specify)	19		
	Total Income (total of lines 08 to 19 inclusive, excluding line 15)	20		
Deductions from Total Income	Canada or Quebec Pension Plan Contributions (see Guide—items 23 and 24)			
	Contributions through employment per Box D on all T4 slips	21		
	Contributions payable on self-employed earnings (from page 3)	22		
	Total Contributions (total of lines 21 and 22)			
	Less: Overpayment of contributions (from page 3)	23		
	Allowable Deduction	24		
	Unemployment Insurance Premiums (see Guide—item 25)			
	Premiums per Box E on all T4 slips	25		
	Less: Overpayment of premiums (from page 3)	26		
	Allowable Deduction (line 25 less line 26)	27		
	Registered pension plan contributions (see Guide—item 26)	28		
	Registered retirement savings plan premiums (attach receipts)	29		
	Annual union, professional or like dues (attach receipts)	30		
	Tuition fees—claimable by student only (see Guide—item 29 and attach receipts)	31		
	Child care expenses (complete and attach Schedule 5)	32		
	Other deductions (see Guide—item 31 and specify)	33		
	Total of lines 24 and 27 to 33 inclusive	34		
	Net Income (line 20 less line 34)	35		
Deductions from Net Income	**Total Personal Exemptions** (complete details on page 4)	36		
	Standard deduction, Medical expenses and charitable donations Claim either A or B, **but not both** (see Guide—item 39)			
	A — Standard deduction of $100.00	37		
	or B — The Total of Allowable Amounts below	38		
	Medical expenses (attach receipts and completed Schedule 3)	39		
	Less: 3% of 'Net Income' (line 35)			
	Allowable portion of medical expenses			
	Add: Charitable donations (attach receipts and completed Schedule 3)	40		
	Total Allowable Amounts			
	Non-Capital losses of other years (see Guide—item 42)	41		
	1972 Capital losses (see Guide—item 43)	42		
	Total of lines 36, 38, 41 and 42	43		
	Taxable Income (line 35 less line 43)	44		

Please do not use this area 95

Employee Overpayment of Contributions and Premiums

Calculation of Canada Pension Plan Overpayment (If you have contributory self-employed earnings, see below)

- The Employee's Canada Pension Plan Contribution Table is on pages 42 and 43 in the Guide.

Calculate Earnings Subject to Contribution at the right. If you became 18 or 70 years of age or received a retirement or disability pension under the Canada or Quebec Pension Plan in 1973, the amounts shown must be prorated as noted in Guide—item 24B.

	$	c
Total Contributory Earnings per T4 slips (maximum $5,600)		
Less: Basic Canada Pension Plan Exemption of $600		
Equals: Earnings Subject to Contribution (maximum $5,000)		

	$	c
Total contributions deducted per Box D on all T4 slips		
Less: Required contribution—1.8% of 'Earnings Subject to Contribution' or amount per Contribution Table, maximum $90		
Canada Pension Plan Overpayment (Enter this amount on line 23 on page 2 and also as a credit on line 49 on page 1)		

Calculation of Unemployment Insurance Overpayment (See Guide - Item 25)

- Calculation I is to be used if your premiums were deducted at one rate throughout the year (that is, all 1% or all .6%).
- Calculation II is to be used *only* if your premiums were deducted at the two rates (1% *and* .6%).
- If the amount of the premium deducted by your employer is less than your required premium, *do not* include the difference with your return.

Calculation I

- Determine the total of your Insurable Earnings from Box H on all your T4 slips. If Box H is blank, use the amount in Box C.
- Compare the total of premiums deducted per Box E on all your T4 slips to the required premium found by reference to the Employee's Unemployment Insurance Premium Table on pages 44 and 45 in the Guide, using the applicable rate of 1% or .6% and the total of your Insurable Earnings (maximum $8,320). Record the result below:

Total premiums deducted per Box E on all T4 slips		(A)
Deduct: Required Premium per Premium Table		(B)
Unemployment Insurance Overpayment (If (A) is greater than (B))		

- If there is an overpayment, enter the amount on line 26 on page 2 and on line 50 on page 1.
- If there is *not* an overpayment, *no further action is required* (the allowable deduction on line 27 on page 2 will be the same amount as that entered on line 25).

Calculation II

Total Insurable Earnings per Box H or, if blank, per Box C on all T4 slips (maximum $8,320)		
Less: Insurable earnings subject to .6% premium per T4 slips (maximum $8,320)		(A)
Equals: Insurable earnings subject to 1% premium		(B)
Total premiums deducted per Box E on all T4 slips		
Less: Required Premium—.6% of Insurable earnings (A), or amount per Premium Table		
Required Premium—1% of Insurable earnings (B), or amount per Premium Table		
Equals: Total Required Premium		
Unemployment Insurance Overpayment (Enter this amount on line 26 on page 2 and on line 50 on page 1)		

Canada Pension Plan Contribution on Self-Employed Earnings (See Guide—item 24)

	$	c
Contributory Self-Employed Earnings		
Add: Contributory earnings from employment per T4 slips		
Equals: Total Contributory Earnings *(If this amount is less than $800, no contribution is required on self-employed earnings.)*		
Deduct: Basic Canada Pension Plan Exemption of $600		
Equals: Earnings Subject to Contribution (maximum $5,000)		
Required Contribution (3.6% of 'Earnings Subject to Contribution': maximum $180)		
Deduct: Contributions through employment *(employee contribution per T4 slips)* (See 'Note' below)	x2 =	
Canada Pension Plan Contribution Payable on Self-Employed Earnings (Enter this amount on line 22 on page 2 and also on line 47 on page 1)		

Note: If the 'Contributions through employment' (multiplied by 2) exceeds your 'Required Contribution' you are entitled to claim an overpayment of contributions equal to one-half of the amount of the excess.

Self-Employment

Type of business or profession

Principal commodity manufactured or sold, or service provided

Name of firm

Location of business (street, city and province)

Names of partners, if any

Location of farm — Total acreage — Cultivated acreage

Gifts

If, in 1973, you made a gift or gifts totalling more than $2,000 in value, a provincial gift tax return may be required not later than 30th April, 1974. For further information, inquire at your District Taxation Office. (Prince Edward Island and Alberta do not levy a gift tax.)

4 Claim for Personal Exemptions **All specified details must be provided for each exemption claimed.**

- Net income of your spouse or dependants includes Old Age Security Pension and Supplement, Canada or Quebec Pension Plan benefits and Unemployment Insurance benefits—see Guide—item 32.
- If you were single, divorced, separated or a widow(er) in 1973 and supported a wholly dependent relative in the same dwelling in which you resided, claim the Equivalent to Married Exemption on Schedule 6.
- If you are claiming dependants other than spouse and children, claim the Exemption for Other Dependants on Schedule 6.
- If you are claiming dependants who did not reside in Canada, complete and attach form T1E-NR which you can obtain from any District Taxation Office.

Basic Personal Exemption — Claim $1600.00 — $

Age Exemption—If you were born in 1908 or earlier — Claim $1000.00

If you are claiming this exemption, did you receive the Old Age Security Pension in 1973? Yes ☐ No ☐

Married Exemption — If applicable, check ✓ and claim item 1 or 2

Married on or before 31st December, 1973, and supported spouse in 1973

1. whose net income in that year, while married, was not over $300. ☐ — Claim $1400.00

2. whose net income in that year, while married, was over $300 but not over $1,700. ☐ — $ 1700 00 — ¢ 62

Less: spouse's net income

Claim

Exemption for Wholly Dependent Children (A) Sons, Daughters or Grandchildren (B) Certain Nieces or Nephews—see Guide—item 36

Children under age 16 at end of 1973—Claim $300 for each child whose net income was not over $1,100. If a child's net income was over $1,100 but not over $1,700, claim $300 **minus one-half** the amount by which the child's net income exceeds $1,100.

Children age 16 or over at end of 1973—Claim $550 for each child whose net income was not over $1,150 and who, if over age 21, was in full-time attendance at a school or university or was infirm. If a child's net income was over $1,150 but not over $1,700, claim $550 **minus** the amount by which the child's net income exceeds $1,150.

Do not claim here for a child you have claimed in the Equivalent to Married Exemption on Schedule 6.

Name of child (attach list if space insufficient)	*Relationship to you*	*Net income in 1973 $*	*Age in 1973*	*If over 21 in 1973, state school attended or whether infirm*	

Other Exemptions

Additional Personal Exemptions per Schedule 6 attached. — 66

Disability deduction for blind persons and persons confined throughout the year to a bed or wheel chair (see Guide—item 38A and specify to whom the claim relates) Self ☐ Spouse ☐ — 67

Education deduction for eligible students and, within limitations, for persons supporting such eligible students (see Guide—item 38B and state name of student) Self ☐ or — 68

Total Other Exemptions

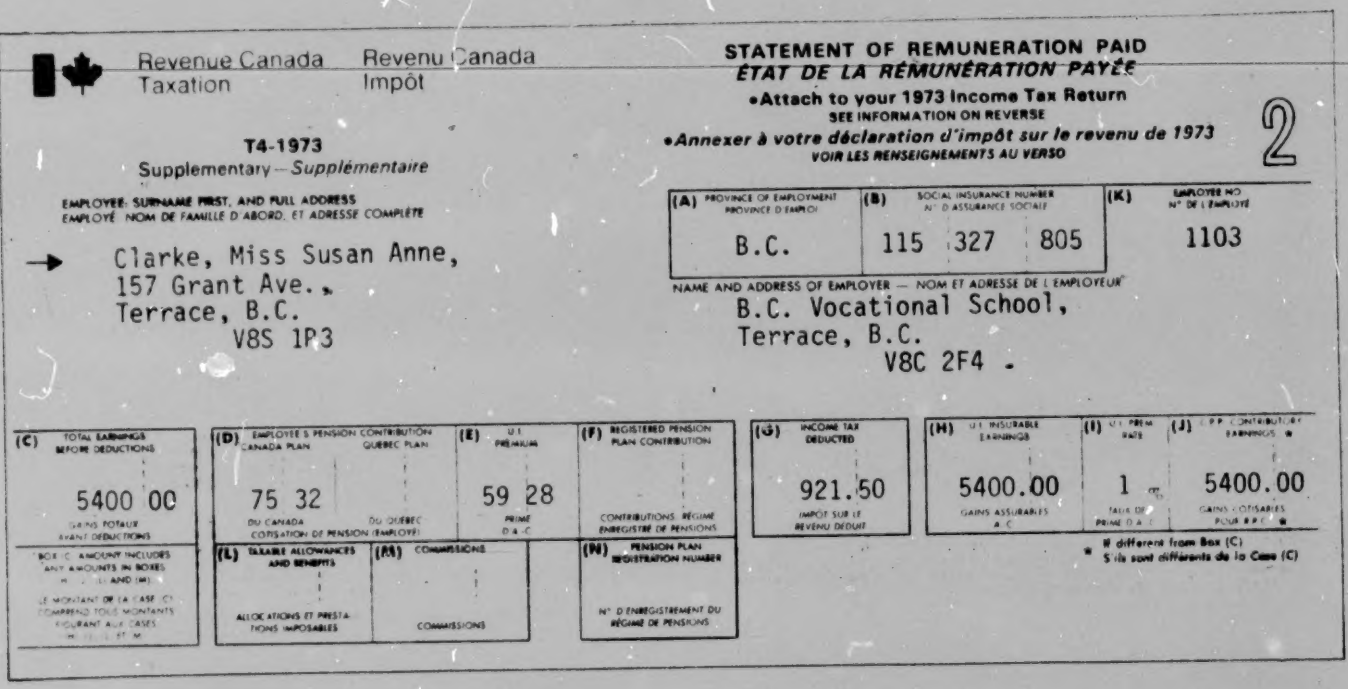
Total Personal Exemptions (Enter this amount on line 36 on page 2)

Income from Self-Employment (Report both 'Gross' and 'Net'. See Guide—item 17)

	$	¢		$	¢
Business income	Gross 69		Net 70		⊙
Professional income	Gross 71		Net 72		⊙
Commission income	Gross 73		Net 74		⊙
Farming income	Gross 75		Net 76		⊙
Fishing income	Gross 77		Net 78		⊙

Net income from self-employment (Enter this amount on line 17 on page 2) — 79

(5) 2. Ask for a current Individualized Income Tax Return form and tax guide. Fill out the tax form given the following information.



Revenue Canada Taxation / Revenu Canada Impôt

T4-1973
Supplementary — *Supplémentaire*

STATEMENT OF REMUNERATION PAID
ÉTAT DE LA RÉMUNÉRATION PAYÉE
•Attach to your 1973 Income Tax Return
SEE INFORMATION ON REVERSE
•*Annexer à votre déclaration d'impôt sur le revenu de 1973*
VOIR LES RENSEIGNEMENTS AU VERSO

2

EMPLOYEE: SURNAME FIRST, AND FULL ADDRESS
EMPLOYÉ: NOM DE FAMILLE D'ABORD, ET ADRESSE COMPLÈTE

Clarke, Miss Susan Anne,
157 Grant Ave.,
Terrace, B.C.
V8S 1P3

(A) PROVINCE OF EMPLOYMENT / PROVINCE D'EMPLOI	(B) SOCIAL INSURANCE NUMBER / N° D'ASSURANCE SOCIALE	(K) EMPLOYEE NO / N° DE L'EMPLOYÉ
B.C.	115 327 805	1103

NAME AND ADDRESS OF EMPLOYER — NOM ET ADRESSE DE L'EMPLOYEUR

B.C. Vocational School,
Terrace, B.C.
V8C 2F4

(C) TOTAL EARNINGS BEFORE DEDUCTIONS / GAINS TOTAUX AVANT DÉDUCTIONS	(D) EMPLOYEE'S PENSION CONTRIBUTION: CANADA PLAN / QUEBEC PLAN — DU CANADA / DU QUÉBEC — COTISATION DE PENSION (EMPLOYÉ)	(E) U.I. PREMIUM / PRIME D'A.-C.	(F) REGISTERED PENSION PLAN CONTRIBUTION / CONTRIBUTIONS RÉGIME ENREGISTRÉ DE PENSIONS	(G) INCOME TAX DEDUCTED / IMPÔT SUR LE REVENU DÉDUIT	(H) U.I. INSURABLE EARNINGS / GAINS ASSURABLES A.-C.	(I) U.I. PREM. RATE / TAUX DE PRIME D'A.-C.	(J) C.P.P. CONTRIBUTORY EARNINGS * / GAINS COTISABLES POUR R.P.C. *
5400 00	75 32	59 28		921.50	5400.00	1	5400.00

BOX (C) AMOUNT INCLUDES ANY AMOUNTS IN BOXES (H), (I) AND (M)
LE MONTANT DE LA CASE (C) COMPREND TOUS MONTANTS FIGURANT AUX CASES (H), (I) ET (M)

(L) TAXABLE ALLOWANCES AND BENEFITS / ALLOCATIONS ET PRESTATIONS IMPOSABLES	(M) COMMISSIONS / COMMISSIONS	(N) PENSION PLAN REGISTRATION NUMBER / N° D'ENREGISTREMENT DU RÉGIME DE PENSIONS

* If different from Box (C)
S'ils sont différents de la Case (C)

Susan is single and works as a secretary at the Vocational School in Terrace. She has lived at the same address for 2 years and this is her first income tax form. She was born on November 17, 1953. Susan also received $15.97 in bank interest and paid $65.00 in tuition fees for a secretarial course (the fees are tax deductable). Determine the amount of federal and provincial tax to be paid and the amount of the balance still to be paid or refund to be received.

Revenue Canada Taxation | Revenu Canada Impôt

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1973 Individual Income Tax Return
(and Canada Pension Plan Return, if applicable)

Family or Last Name (Print)
Mr.
Mrs.
Miss

♦ Social Insurance Number ● Date of Birth
As on your Social Insurance Number card — Day — Month

Usual First Name and Initials (Print)

♦ Province or Territory of Residence on 31st December 1973, was:

Present Address (Print)

♦ If self-employed in 1973, state province in which business was lo

Number, Street and Apt. No., or P.O. Box No. or R.R. No.

Provide other information concerning self-employment on page 3.

City, Province, Postal Zone or Postal Code

♦ As at 31st December 1973, I was:

Mailing Address (if different from above)

1 ☐ Married to ◊ ●
2 ☐ A Widow(er)
3 ☐ Divorced
4 ☐ Separated
5 ☐ Single

Usual First Name of Spouse
whose address is: same as mine ☐ or

Spouse's Social Insurance Number

● Is this your first Income Tax return? Yes ☐ No ☐
If 'No', state year for which last return filed. 19

♦ If you became or ceased to be a resident of Canada in 1973, give:
Date of Entry | or Departure |
(See Guide—item 37) Day Month Day

Name on last return: same as above ☐ or

Type of work or occupation in 1973

Address on last return: same as above ☐ or

Name of present employer

Summary of Tax and Credits

There are two methods of tax calculation:
(1) Tax Table (2) Detailed
To determine which method you should use, see Guide—page 30.

Note: If using Detailed method, complete the following lines if applicable:

Taxable Income from line 44 on page 2 $

Tax Adjustments
57 53 $ •

Income or Profits Tax paid to a foreign country
54 $ •

Net foreign income
55 $

Please do not use this area
56 •
57
58
59
60
61
62
63
64

		$	¢
Federal Tax Payable	45		
Provincial Tax Payable (Except Quebec)	46		
Total Tax Payable	♦		•
Add: Canada Pension Plan Contribution Payable on Self-Employed Earnings (from page 3)	47		•
Total Payable			◊
Total tax deducted per information slips	♦		94 •
Canada Pension Plan Overpayment (from page 3)	49		•
Unemployment Insurance Overpayment (from page 3)	50		⊙ •
Amounts paid by instalments (Tax and C.P.P.)	51		•
Total Credits			◊

Enter this difference in applicable space below

A difference of less than $1.00 is neither charged nor refunded.

Refund 1 •

Detach the refund sticker from the cover of the Schedules and place it over the postal code printed on the return envelope.

Balance Due 7

Amount Enclosed

Attach cheque or money order payable to **Receiver General for Canada**. **Do not mail cash.** Payment is due not later than 30th April, 1974.

Name and address of the individual or firm, other than the taxpayer, who has prepared this return for compensation.

Name

Address

Telephone

I hereby certify that the information given in this return and in all documents attached is true, correct and complete in every respect and fully discloses my income from all sources.

Sign here

Date Telephone

27

403 117

It is a serious offence to make a false return.

2 Summary of Income and Deductions

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Income from Employment

		$	c
Total Earnings Before Deductions per Box C on all T4 slips (attach copy 2 of T4 slips)	01		
Commissions per Box M on all T4 slips, included in above total	02		
Adult training allowances, net research grants, tips and gratuities (see Guide—item 3 and specify)	03		
Total employment earnings (total of lines 01 and 03)	04		
Deduct:			
3% of 'Total employment earnings' (line 04 above)— maximum $150 (see Guide—item 4)	05		
Other allowable expenses (see Guide—item 5 and specify)	06		
Total employment expenses (total of lines 05 and 06)	07		
Net employment earnings (line 04 less line 07)	08		

Pension Income

Old Age Security Pension ($1164.54 for year—for less than year, see Guide—item 8)	09		
Canada or Quebec Pension Plan benefits (attach copy 2 of T4A (P) slip)	10		
Other pensions or superannuation (attach copy 3 of T4A slips)	11		

Income from Other Sources

Unemployment Insurance benefits (attach copy 1 of T4U slip)	12		
Taxable amount of dividends from taxable Canadian corporations (attach completed Schedule 4)	13		
Interest and other investment income (attach list or completed Schedule 4)	14		
Rental income (Schedule 7) Gross 15	Net 16		
Net income from self-employment (complete applicable lines 69 to 79 on page 4)	17		
Taxable capital gains or allowable capital losses (complete and attach Schedule 2)	18		
Other income (see Guide—item 16 and specify)	19		
Total Income (total of lines 08 to 19 inclusive, excluding line 15)	20		

Deductions from Total Income

Canada or Quebec Pension Plan Contributions (see Guide—items 23 and 24)			
Contributions through employment per Box D on all T4 slips	21		
Contribution payable on self-employed earnings (from page 3)	22		
Total Contributions (total of lines 21 and 22)			
Less: Overpayment of contributions (from page 3)	23		
Allowable Deduction	24		
Unemployment Insurance Premiums (see Guide—item 25)			
Premiums per Box E on all T4 slips	25		
Less: Overpayment of premiums (from page 3)	26		
Allowable Deduction (line 25 less line 26)	27		
Registered pension plan contributions (see Guide—item 26)	28		
Registered retirement savings plan premiums (attach receipts)	29		
Annual union, professional or like dues (attach receipts)	30		
Tuition fees—claimable by student only (see Guide—item 29 and attach receipts)	31		
Child care expenses (complete and attach Schedule 5)	32		
Other deductions (see Guide—item 31 and specify)	33		
Total of lines 24 and 27 to 33 inclusive	34		
Net Income (line 20 less line 34)	35		

Deductions from Net Income

Total Personal Exemptions (complete details on page 4)	36		
Standard deduction, Medical expenses and charitable donations			
Claim either A or B, but not both (see Guide—item 39)			
A — Standard deduction of $100.00	37		
or B — The Total of Allowable Amounts below	38		
Medical expenses (attach receipts and completed Schedule 3)	39		
Less: 3% of 'Net Income' (line 35)			
Allowable portion of medical expenses			
Add: Charitable donations (attach receipts and completed Schedule 3)	40		
Total Allowable Amounts			
Non-Capital losses of other years (see Guide—item 42)	41		
1972 Capital losses (see Guide—item 43)	42		
Total of lines 36, 38, 41 and 42	43		
Taxable Income (line 35 less line 43)	44		

Please do not use this area 45

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Employee Overpayment of Contributions and Premiums

Calculation of Canada Pension Plan Overpayment (If you have contributory self-employed earnings, see below)

- The Employee's Canada Pension Plan Contribution Table is on pages 42 and 43 in the Guide.

Calculate Earnings Subject to Contribution at the right. If you became 18 or 70 years of age or received a retirement or disability pension under the Canada or Quebec Pension Plan in 1973, the amounts shown must be prorated as noted in Guide—item 24B.

	$	c
Total Contributory Earnings per T4 slips (maximum $5,600)		
Less: Basic Canada Pension Plan Exemption of $600		
Equals: Earnings Subject to Contribution (maximum $5,000)		

	$
Total contributions deducted per Box D on all T4 slips	
Less: Required contribution—1.8% of 'Earnings Subject to Contribution' or amount per Contribution Table, maximum $90	
Canada Pension Plan Overpayment (Enter this amount on line 23 on page 2 and also as a credit on line 49 on page 1)	

Calculation of Unemployment Insurance Overpayment (See Guide - Item 25)

- Calculation I is to be used if your premiums were deducted at one rate throughout the year (that is, all 1% or all .6%).
- Calculation II is to be used *only* if your premiums were deducted at the two rates (1% *and* .6%).
- If the amount of the premium deducted by your employer is less than your required premium, *do not* include the difference with your return.

Calculation I

- Determine the total of your Insurable Earnings from Box H on all your T4 slips. If Box H is blank, use the amount in Box C.
- Compare the total of premiums deducted per Box E on all your T4 slips to the required premium found by reference to the Employee's Unemployment Insurance Premium Table on pages 44 and 45 in the Guide, using the applicable rate of 1% or .6% and the total of your Insurable Earnings (maximum $8,320). Record the result below:

Total premiums deducted per Box E on all T4 slips		(A)
Deduct: Required Premium per Premium Table		(B)
Unemployment Insurance Overpayment (If (A) is greater than (B))		

- If there is an overpayment, enter the amount on line 26 on page 2 and on line 50 on page 1.
- If there is *not* an overpayment, *no further action is required* (the allowable deduction on line 27 on page 2 will be the same amount as that entered on line 25).

Calculation II

Total Insurable Earnings per Box H or, if blank, per Box C on all T4 slips (maximum $8,320)		
Less: Insurable earnings subject to .6% premium per T4 slips (maximum $8,320)		(A)
Equals: Insurable earnings subject to 1% premium		(B)
Total premiums deducted per Box E on all T4 slips		
Less: Required Premium—.6% of Insurable earnings (A), or amount per Premium Table		
Required Premium—1% of Insurable earnings (B), or amount per Premium Table		
Equals: Total Required Premium		
Unemployment Insurance Overpayment (Enter this amount on line 26 on page 2 and on line 50 on page 1)		

Canada Pension Plan Contribution on Self-Employed Earnings (See Guide—item 24)

Contributory Self-Employed Earnings		
Add: Contributory earnings from employment per T4 slips		
Equals: Total Contributory Earnings *(If this amount is less than $800, no contribution is required on self-employed earnings.)*		
Deduct: Basic Canada Pension Plan Exemption of $600		
Equals: Earnings Subject to Contribution (maximum $5,000)		$
Required Contribution (3.6% of 'Earnings Subject to Contribution': maximum $180)		
Deduct: Contributions through employment *(employee contribution per T4 slips)* (See 'Note' below)	x2 =	
Canada Pension Plan Contribution Payable on Self-Employed Earnings (Enter this amount on line 22 on page 2 and also on line 47 on page 1)		

Note: If the 'Contributions through employment' (multiplied by 2) exceeds your 'Required Contribution' you are entitled to claim an overpayment of contributions equal to one-half of the amount of the excess.

Self-Employment

Type of business or profession

Principal commodity manufactured or sold, or service provided

Name of firm

Location of business (street, city and province)

Names of partners, if any

Location of farm | Total acreage | Cultivated acreage

Gifts

If, in 1973, you made a gift or gifts totalling more than $2,000 in value, a provincial gift tax return may be required not later than 30th April, 1974. For further information, inquire at your District Taxation Office. (Prince Edward Island and Alberta do not levy a gift tax.)

Claim for Personal Exemptions All specified details must be provided for each exemption claimed.

- Net income of your spouse or dependants includes Old Age Security Pension and Supplement, Canada or Quebec Pension Plan benefits and Unemployment Insurance benefits—see Guide—item 32.
- If you were single, divorced, separated or a widow(er) in 1973 and supported a wholly dependent relative in the same dwelling in which you resided, claim the Equivalent to Married Exemption on Schedule 6.
- If you are claiming dependants other than spouse and children, claim the Exemption for Other Dependants on Schedule 6.
- If you are claiming dependants who did not reside in Canada, complete and attach form T1E-NR which you can obtain from any District Taxation Office.

	$	c
Basic Personal Exemption — Claim $1600.00		
Age Exemption—If you were born in 1908 or earlier — Claim $1000.00		
If you are claiming this exemption, did you receive the Old Age Security Pension in 1973? Yes ☐ No ☐		
Married Exemption — If applicable, check ✓ and claim item 1 or 2		
Married on or before 31st December, 1973, and supported spouse in 1973		
1. whose net income in that year, while married, was not over $300. ☐ — Claim $1400.00		
2. whose net income in that year, while married, was over $300 but not over $1,700. ☐		55
	1700	00
Less: spouse's net income		
Claim		

Exemption for Wholly Dependent Children (A) Sons, Daughters or Grandchildren
(B) Certain Nieces or Nephews—see Guide—item 36

Children under age 16 at end of 1973—Claim $300 for each child whose net income was not over $1,100. If a child's net income was over $1,100 but not over $1,700, claim $300 **minus one-half** the amount by which the child's net income exceeds $1,100.

Children age 16 or over at end of 1973—Claim $550 for each child whose net income was not over $1,150 and who, if over age 21, was in full-time attendance at a school or university or was infirm. If a child's net income was over $1,150 but not over $1,700, claim $550 **minus** the amount by which the child's net income exceeds $1,150.

Do not claim here for a child you have claimed in the Equivalent to Married Exemption on Schedule 6.

Name of child (attach list if space insufficient)	*Relationship to you*	*Net income in 1973 $*	*Age in 1973*	*If over 21 in 1973, state school attended or whether infirm*

Other Exemptions

		$	c
Additional Personal Exemptions per Schedule 6 attached.	66		
Disability deduction for blind persons and persons confined throughout the year to a bed or wheel chair (see Guide—item 38A and specify to whom the claim relates) Self ☐ Spouse ☐	67		
Education deduction for eligible students and, within limitations, for persons supporting such eligible students (see Guide—item 38B and state name of student) Self ☐ or	68		
Total Other Exemptions			

Total Personal Exemptions (Enter this amount on line 36 on page 2)

Income from Self-Employment (Report both 'Gross' and 'Net'. See Guide—item 17)

		$	c		$	c
Business income	Gross 69			Net 70		
Professional income	Gross 71			Net 72		
Commission income	Gross 73			Net 74		
Farming income	Gross 75			Net 76		
Fishing income	Gross 77			Net 78		

Net income from self-employment (Enter this amount on line 17 on page 2) 79

Form authorized and prescribed by the Minister of National Revenue.

(5) 3. Circle the best answer for each of the following:

1. Every Canadian must file an income tax return if his income is over -

   a. $ 100
   b. $ 550
   c. $ 1100
   d. $ 1600

2. Which of the following cannot be deducted from your Total Income, when calculating your Net Income.

   a. Unemployment Insurance premiums
   b. Union dues
   c. Medical expenses
   d. Tuition fees

3. Which item would not be part of your Personal Exemptions.

   a. a child over sixteen
   b. a child whose income was $ 1,150
   c. a wife whose income was $ 1,550
   d. child care expenses

4. Taxable income is:-

   a. The amount of federal tax to be paid
   b. Your total income
   c. The amount of income on which you pay tax
   d. Net income after taxes

5. The B.C. provincial tax rate is what percent of the federal rate -

   a. 10 %
   b. 17.5 %
   c. 22 %
   d. 30.5 %

Mathematics Item Progress Check

UNIT VI: CONSUMER MATH Name: _____

ITEM B: INCOME TAX Date: _____

Form 2

Criterion: 12/ 15
Score: ___/___

(5) 1. Ask for a current Individualized Income Tax Return form and tax guide. Fill out the tax form given the following information.

Revenue Canada Taxation / Revenu Canada Impôt

T4-1973
Supplementary — *Supplémentaire*

STATEMENT OF REMUNERATION PAID
ÉTAT DE LA RÉMUNÉRATION PAYÉE
•Attach to your 1973 Income Tax Return
SEE INFORMATION ON REVERSE
•*Annexer à votre déclaration d'impôt sur le revenu de 1973*
VOIR LES RENSEIGNEMENTS AU VERSO

2

EMPLOYEE SURNAME FIRST, AND FULL ADDRESS
EMPLOYÉ NOM DE FAMILLE D'ABORD, ET ADRESSE COMPLÈTE

Wilson, Mr. John,
747 Bute St.,
Hope, B.C.
V5K 1C7

(A) PROVINCE OF EMPLOYMENT	(B) SOCIAL INSURANCE NUMBER	(K) EMPLOYEE NO
B.C.	704 117 321	732107

NAME AND ADDRESS OF EMPLOYER — NOM ET ADRESSE DE L'EMPLOYEUR

B.C. Telephone Co.,
Hope, B.C.
V5J 7E2

(C) TOTAL EARNINGS	(D) EMPLOYEE'S PENSION CONTRIBUTION CANADA PLAN / QUEBEC PLAN	(E) U.I. PREMIUM	(F) REGISTERED PENSION PLAN CONTRIBUTION	(G) INCOME TAX DEDUCTED	(H) U.I. INSURABLE EARNINGS	(I) U.I. PREMIUM RATE	(J) C.P.P. CONTRIBUTORY EARNINGS *
9187 20	90 00 /	83 20	532 70	1043 18	8320 00	1	5600 00

BOX C AMOUNT INCLUDES ANY AMOUNTS IN BOXES H AND J

(L) TAXABLE ALLOWANCES AND BENEFITS — ALLOCATIONS ET PRESTATIONS IMPOSABLES

(M) COMMISSIONS — COMMISSIONS

(N) PENSION PLAN REGISTRATION NUMBER — N° D'ENREGISTREMENT DU RÉGIME DE PENSIONS: 103572

* If different from Box (C) / *S'il est différent de la Case (C)*

Revenue Canada Taxation | Revenu Canada Impôt

STATEMENT OF REMUNERATION PAID
ÉTAT DE LA RÉMUNÉRATION PAYÉE

•Attach to your 1973 Income Tax Return
SEE INFORMATION ON REVERSE
•*Annexer à votre déclaration d'impôt sur le revenu de 1973*
VOIR LES RENSEIGNEMENTS AU VERSO

T4-1973 2

Supplementary — *Supplémentaire*

EMPLOYEE: SURNAME FIRST, AND FULL ADDRESS
EMPLOYÉ: NOM DE FAMILLE D'ABORD, ET ADRESSE COMPLÈTE

Wilson, Mrs. Cathy,
747 Hute St.,
Hope, B.C.
V5K 1C7

(A) PROVINCE OF EMPLOYMENT / PROVINCE D'EMPLOI	(B) SOCIAL INSURANCE NUMBER / N° D'ASSURANCE SOCIALE	(K) EMPLOYER NO. / N° DE L'EMPLOYÉ
B.C.	111 743 342	53

NAME AND ADDRESS OF EMPLOYER — NOM ET ADRESSE DE L'EMPLOYEUR

Joe's Bar and Grill,
17 Front St.,
Hope, B.C.
V5K 3R1

(C) TOTAL EARNINGS BEFORE DEDUCTIONS / GAINS TOTAUX AVANT DÉDUCTIONS	(D) EMPLOYEE'S PENSION CONTRIBUTION: CANADA PLAN / QUEBEC PLAN — DU CANADA / DU QUÉBEC — COTISATION DE PENSION (EMPLOYÉ)	(E) U.I. PREMIUM / PRIME D'A.-C.	(F) REGISTERED PENSION PLAN CONTRIBUTION / CONTRIBUTIONS RÉGIME ENREGISTRÉ DE PENSIONS	(G) INCOME TAX DEDUCTED / IMPÔT SUR LE REVENU DÉDUIT	(H) U.I. INSURABLE EARNINGS / GAINS ASSURABLES A.-C.	(I) U.I. PREM. RATE / TAUX DE PRIME D'A.-C.	(J) C.P.P. CONTRIBUTORY EARNINGS * / GAINS COTISABLES RPC *
685 10							

BOX (C) AMOUNT INCLUDES ANY AMOUNTS IN BOXES (K), (L) AND (M) / LE MONTANT DE LA CASE (C) COMPREND TOUS MONTANTS FIGURANT AUX CASES (K), (L) ET (M)

(L) TAXABLE ALLOWANCES AND BENEFITS / ALLOCATIONS ET PRESTATIONS IMPOSABLES	(M) COMMISSIONS / COMMISSIONS	(N) PENSION PLAN REGISTRATION NUMBER / N° D'ENREGISTREMENT DU RÉGIME DE PENSIONS

* If different from Box (C) / *S'ils sont différents de la Case (C)*

John lives with his wife Cathy (Social Insurance Number 113 721 845) and their 3 children (Sam aged 13, Bill aged 8, and Monica aged 18 months). Last year he lived in Toronto and has always filed a tax return. John, a telephone repairman was born on March 18, 1935. His wife worked part time as a cook. John received $27.80 bank interest and paid $117.32 union dues. Determine the amount of federal and provincial tax to be paid, and the amount of the balance still to be paid or refund claimed.

Revenue Canada Taxation | Revenu Canada Impôt

T1 1973

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1973 Individual Income Tax Return
(and Canada Pension Plan Return, if applicable)

Family or Last Name (Print)

Mr.
Mrs.
Miss

Usual First Name and Initials (Print)

Present Address (Print)

Number, Street and Apt. No., or P.O. Box No. or R.R. No.

City, Province, Postal Zone or Postal Code

Mailing Address (if different from above)

♦ Social Insurance Number ● Date of Birth

As on your Social Insurance Number card — *Day* *Month* *Year*

♦ Province or Territory of Residence on 31st December 1973 was

♦ If self-employed in 1973, state province in which business was located

Provide other information concerning self-employment on page 3

♦ As at 31st December 1973, I was:

1 Married to ◊ ●
2 A Widow(er) — *Usual First Name of Spouse*
3 Divorced — whose address is same as mine or
4 Separated
5 Single

Spouse's Social Insurance Number

● Is this your first Income Tax return? Yes No

If "No", state year for which last return filed: 19

Name on last return: same as above or

Address on last return: same as above or

♦ If you became or ceased to be a resident of Canada in 1973, give:

Date of Entry (See Guide – item 37) Day Month or Departure Day Month

Type of work or occupation in 1973

Name of present employer

Summary of Tax and Credits

There are two methods of tax calculation:
(1) Tax Table (2) Detailed
To determine which method you should use, see Guide – page 30

Note: If using Detailed method, complete the following lines, if applicable:

Tax Adjustments
(52) (53) $ •

Income or Profits Tax paid to a foreign country
(54) $ •

Net foreign income
(55) $

Please do not use this area
(56) •
(57)
(58)
(59)
(60)
(61)
(62)
(63)
(64)

Taxable Income from line 44 on page 2

$ $ ¢

Federal Tax Payable 45
Provincial Tax Payable (Except Quebec) 46
Total Tax Payable ♦ •
Add: Canada Pension Plan Contribution Payable on Self-Employed Earnings (from page 3) (47) •
Total Payable ◊

Total tax deducted per information slips ♦ 94 •
Canada Pension Plan Overpayment (from page 3) (48) •
Unemployment Insurance Overpayment (from page 3) (50) •
Amounts paid by instalments (Tax and C.P.P.) (51) •
Total Credits ◊

Enter this difference in applicable space below

A difference of less than $1.00 is neither charged nor refunded

Refund (1) • Detach the refund sticker from the cover of the Schedules and place it over the postal code printed on the return envelope.

Balance Due (2) •

Amount Enclosed •

Attach cheque or money order **payable to Receiver General for Canada. Do not mail cash.** Payment is due not later than 30th April, 1974.

Name and address of the individual or firm, other than the taxpayer, who has prepared this return for compensation.

Name

Address

Telephone

I hereby certify that the information given in this return and in any documents attached is true, correct and complete in every respect and fully discloses my income from all sources.

Sign here

Date Telephone

It is a serious offence to make a false return.

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2 Summary of Income and Deductions

93

$ C

Income from Employment

Total Earnings Before Deductions per Box C on all T4 slips (attach copy 2 of T4 slips)	01		
Commissions per Box M on all T4 slips, included in above total	02		
Adult training allowances, net research grants, tips and gratuities (see Guide—item 3 and specify)	03		
Total employment earnings (total of lines 01 and 03)	04		
Deduct:			
3% of 'Total employment earnings' (line 04 above) — maximum $150 (see Guide—item 4)	05		
Other allowable expenses (see Guide—item 5 and specify)	06		
Total employment expenses (total of lines 05 and 06)	07		
Net employment earnings (line 04 less line 07)	08		

Pension Income

Old Age Security Pension ($1 164.54 for year—for less than year, see Guide—item 6)	09		
Canada or Quebec Pension Plan benefits (attach copy 2 of T4A (P) slip)	10		
Other pensions or superannuation (attach copy 3 of T4A slips)	11		

Income from Other Sources

Unemployment Insurance benefits (attach copy 1 of T4U slip)	12				
Taxable amount of dividends from taxable Canadian corporations (attach completed Schedule 4)	13				
Interest and other investment income (attach list or completed Schedule 4)	14				
Rental income (Schedule 7)	Gross	15	Net	16	
Net income from self-employment (complete applicable lines 69 to 79 on page 4)				17	
Taxable capital gains or allowable capital losses (complete and attach Schedule 2)				18	
Other income (see Guide—item 16 and specify)				19	
Total income (total of lines 08 to 19 inclusive, excluding line 15)				20	

Deductions from Total Income

Canada or Quebec Pension Plan Contributions (see Guide—items 23 and 24)					
Contributions through employment per Box D on all T4 slips	21				
Contribution payable on self-employed earnings (from page 3)	22				
Total Contributions (total of lines 21 and 22)					
Less: Overpayment of contributions (from page 3)	23				
Allowable Deduction	24				
Unemployment Insurance Premiums (see Guide—item 25)					
Premiums per Box E on all T4 slips	25				
Less: Overpayment of premiums (from page 3)	26				
Allowable Deduction (line 25 less line 26)	27				
Registered pension plan contributions (see Guide—item 26)				28	
Registered retirement savings plan premiums (attach receipts)				29	
Annual union, professional or like dues (attach receipts)				30	
Tuition fees—claimable by student only (see Guide—item 29 and attach receipts)				31	
Child care expenses (complete and attach Schedule 5)				32	
Other deductions (see Guide—item 31 and specify)				33	
Total of lines 24 and 27 to 33 inclusive				34	
Net Income (line 20 less line 34)				35	

Deductions from Net Income

Total Personal Exemption (complete details on page 4)				36	
Standard deduction, Medical expenses and charitable donations					
Claim either A or B, but not both (see Guide—item 39)					
A — Standard deduction of $100.00	37				
or B — The Total of Allowable Amounts below			38		
Medical expenses (attach receipts and completed Schedule 3)	39				
Less: 3% of 'Net Income' (line 35)					
Allowable portion of medical expenses					
Add: Charitable donations (attach receipts and completed Schedule 3)	40				
Total Allowable Amounts					
Non-Capital losses of other years (see Guide—item 42)				41	
1972 Capital losses (see Guide—item 43)				42	
Total of lines 36, 38, 41 and 42				43	
Taxable Income (line 35 less line 43)				44	

Please do not use this area C

125 411

Employee Overpayment of Contributions and Premiums

Calculation of Canada Pension Plan Overpayment (If you have contributory self-employed earnings, see below)

- The Employee's Canada Pension Plan Contribution Table is on pages 42 and 43 in the Guide.

Calculate Earnings Subject to Contribution at the right. If you became 18 or 70 years of age or received a retirement or disability pension under the Canada or Quebec Pension Plan in 1973, the amounts shown must be prorated as noted in Guide—item 24B

	$	c
Total Contributory Earnings per T4 slips (maximum $5,600)		
Less: Basic Canada Pension Plan Exemption of $600		
Equals: Earnings Subject to Contribution (maximum $5,000)		

	$	c
Total contributions deducted per Box D on all T4 slips		
Less: Required contribution—1.8% of 'Earnings Subject to Contribution' or amount per Contribution Table, maximum $90		
Canada Pension Plan Overpayment (Enter this amount on line 23 on page 2 and also as a credit on line 49 on page 1)		

Calculation of Unemployment Insurance Overpayment (See Guide - Item 25)

- Calculation I is to be used if your premiums were deducted at one rate throughout the year (that is, all 1% or all .6%).
- Calculation II is to be used *only* if your premiums were deducted at the two rates (1% *and* .6%).
- If the amount of the premium deducted by your employer is less than your required premium, *do not* include the difference with your return.

Calculation I

- Determine the total of your insurable Earnings from Box H on all your T4 slips. If Box H is blank, use the amount in Box C.
- Compare the total of premiums deducted per Box E on all your T4 slips to the required premium found by reference to the Employee's Unemployment Insurance Premium Table on pages 44 and 45 in the Guide, using the applicable rate of 1% or .6% and the total of your Insurable Earnings (maximum $8,320). Record the result below:

Total premiums deducted per Box E on all T4 slips		(A)
Deduct: Required Premium per Premium Table		(B)
Unemployment Insurance Overpayment (If (A) is greater than (B))		

- If there is an overpayment, enter the amount on line 26 on page 2 and on line 50 on page 1.
- If there is *not* an overpayment, *no further action is required* (the allowable deduction on line 27 on page 2 will be the same amount as that entered on line 25).

Calculation II

Total Insurable Earnings per Box H or, if blank, per Box C on all T4 slips (maximum $8,320)		
Less: Insurable earnings subject to .6% premium per T4 slips (maximum $8,320)		(A)
Equals: Insurable earnings subject to 1% premium		(B)
Total premiums deducted per Box E on all T4 slips		
Less: Required Premium—.6% of Insurable earnings (A), or amount per Premium Table		
Required Premium—1% of Insurable earnings (B), or amount per Premium Table		
Equals: Total Required Premium		
Unemployment Insurance Overpayment (Enter this amount on line 26 on page 2 and on line 50 on page 1)		

Canada Pension Plan Contribution on Self-Employed Earnings (See Guide—item 24)

	$	c
Contributory Self-Employed Earnings		
Add: Contributory earnings from employment per T4 slips		
Equals: Total Contributory Earnings *(If this amount is less than $800, no contribution is required on self-employed earnings.)*		
Deduct: Basic Canada Pension Plan Exemption of $600		
Equals: Earnings Subject to Contribution (maximum $5,000)		
Required Contribution (3.6% of 'Earnings Subject to Contribution': maximum $180)		
Deduct: Contributions through employment *(employee contribution per T4 slips)* (See 'Note' below)	x2 =	
Canada Pension Plan Contribution Payable on Self-Employed Earnings (Enter this amount on line 22 on page 2 and also on line 47 on page 1)		

Note: If the 'Contributions through employment' (multiplied by 2) exceeds your 'Required Contribution' you are entitled to claim an overpayment of contributions equal to one-half of the amount of the excess.

Self-Employment

Type of business or profession

Principal commodity manufactured or sold, or service provided

Name of firm

Location of business (street, city and province)

Names of partners, if any

Location of farm — Total acreage — Cultivated acreage

Gifts

If, in 1973, you made a gift or gifts totalling more than $2,000 in value, a provincial gift tax return may be required not later than 30th April, 1974. For further information, inquire at your District Taxation Office. (Prince Edward Island and Alberta do not levy a gift tax.)

4 Claim for Personal Exemptions **All specified details must be provided for each exemption claimed.**

- Net income of your spouse or dependants includes Old Age Security Pension and Supplement, Canada or Quebec Pension Plan benefits and Unemployment Insurance benefits – see Guide—item 32.
- If you were single, divorced, separated or a widow(er) in 1973 and supported a wholly dependent relative in the same dwelling in which you resided, claim the Equivalent to Married Exemption on Schedule 6.
- If you are claiming dependants other than spouse and children, claim the Exemption for Other Dependants on Schedule 6.
- If you are claiming dependants who did not reside in Canada, complete and attach form T1E-NR which you can obtain from any District Taxation Office

Basic Personal Exemption — Claim $1600.00 — $

Age Exemption—If you were born in 1908 or earlier — Claim $1000.00

If you are claiming this exemption, did you receive the Old Age Security Pension in 1973? Yes ☐ No ☐

Married Exemption — If applicable, check √ and claim item 1 or 2

Married on or before 31st December, 1973, and supported spouse in 1973

1. whose net income in that year, while married, was not over $300. ☐ — Claim $1400.00

2. whose net income in that year, while married, was over $300 but not over $1,700. ☐ — $ 1700 00 — c (65)

Less: spouse's net income

Claim

Exemption for Wholly Dependent Children (A) Sons, Daughters or Grandchildren (B) Certain Nieces or Nephews—see Guide—item 36

Children under age 16 at end of 1973—Claim $300 for each child whose net income was not over $1,100. If a child's net income was over $1,100 but not over $1,700, claim $300 **minus one-half** the amount by which the child's net income exceeds $1,100.

Children age 16 or over at end of 1973—Claim $550 for each child whose net income was not over $1,150 and who, if over age 21, was in full-time attendance at a school or university or was infirm. If a child's net income was over $1,150 but not over $1,700, claim $550 **minus** the amount by which the child's net income exceeds $1,150.

Do not claim here for a child you have claimed in the Equivalent to Married Exemption on Schedule 6.

Name of child (attach list if space insufficient)	*Relationship to you*	*Net income in 1973 $*	*Age in 1973*	*If over 21 in 1973, state school attended or whether infirm*

Other Exemptions

Additional Personal Exemptions per Schedule 6 attached. (66)

Disability deduction for blind persons and persons confined throughout the year to a bed or wheel chair (see Guide—item 38A and specify to whom the claim relates) Self ☐ Spouse ☐ (67)

Education deduction for eligible students and, within limitations, for persons supporting such eligible students (see Guide—item 38B and state name of student) Self ☐ or (68)

Total Other Exemptions

Total Personal Exemptions (Enter this amount on line 36 on page 2)

Income from Self-Employment (Report both 'Gross' and 'Net'. See Guide—item 17)

	$	c	$	c
Business income	Gross (69)		Net (70)	
Professional income	Gross (71)		Net (72)	
Commission income	Gross (73)		Net (74)	
Farming income	Gross (75)		Net (76)	
Fishing income	Gross (77)		Net (78)	

Net income from self-employment (Enter this amount on line 17 on page 2) 79

Form authorized and prescribed by the Minister of National Revenue.

(5) 2. Ask for a current Individualized Income Tax Return form and tax guide. Fill out the tax form given the following information.

Revenue Canada Taxation / Revenu Canada Impôt

T4-1973
Supplementary — *Supplémentaire*

STATEMENT OF REMUNERATION PAID
ÉTAT DE LA RÉMUNÉRATION PAYÉE
•Attach to your 1973 Income Tax Return
SEE INFORMATION ON REVERSE
•*Annexer à votre déclaration d'impôt sur le revenu de 1973*
VOIR LES RENSEIGNEMENTS AU VERSO

2

EMPLOYEE: SURNAME FIRST, AND FULL ADDRESS
EMPLOYÉ: NOM DE FAMILLE D'ABORD, ET ADRESSE COMPLÈTE

→ Brown, Miss Betty,
5 Goldengate Road,
Vancouver, B.C.
V6P 3Q7

(A) PROVINCE OF EMPLOYMENT / PROVINCE D'EMPLOI	(B) SOCIAL INSURANCE NUMBER / N° D'ASSURANCE SOCIALE	(K) EMPLOYEE NO. / N° DE L'EMPLOYÉ
B.C.	512 347 205	1073

NAME AND ADDRESS OF EMPLOYER — NOM ET ADRESSE DE L'EMPLOYEUR
Kirby Insurance Agency,
117 Kingsway,
Vancouver, B.C.
V5Q 5R2

(C) TOTAL EARNINGS BEFORE DEDUCTIONS	(D) EMPLOYEE'S PENSION CONTRIBUTION: CANADA PLAN / QUEBEC PLAN	(E) U.I. PREMIUM	(F) REGISTERED PENSION PLAN CONTRIBUTION	(G) INCOME TAX DEDUCTED	(H) U.I. INSURABLE EARNINGS	(I) U.I. PREM. RATE	(J)
6750 00				892 71			

(L) TAXABLE ALLOWANCES AND BENEFITS	(M) COMMISSIONS	(N) PENSION PLAN REGISTRATION NUMBER
	750 00	

* If different from Box (C)
* S'il est différent de la Case (C)

Betty lives with her invalid mother, aged 87. Miss Brown is 67 years old and has lived at the same address and worked for the same firm for many years. Both Miss Brown and her mother each receive a Canada Pension Plan pension of $1164.54 for the year. Determine the amount of federal and provincial tax to be paid, and the amount of the balance still to be paid or refund claimed. Miss Brown was born on July 15, 1907, and works as a secretary.

Revenue Canada Taxation | Revenu Canada Impôt

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1973 Individual Income Tax Return
(and Canada Pension Plan Return, if applicable)

Family or Last Name (Print)
Mr.
Mrs.
Miss

Usual First Name and Initials (Print)

Present Address (Print)

Number, Street and Apt. No., or P.O. Box No. or R.R. No.

City, Province, Postal Zone or Postal Code

Mailing Address (if different from above)

● Is this your first Income Tax return? Yes | No |
If 'No', state year for which last return filed. 19
Name on last return: same as above | | or
Address on last return: same as above | | or

♦ Social Insurance Number | | |

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Summary of Income and Deductions

		$	C
Income from Employment	Total Earnings Before Deductions per Box C on all T4 slips (attach copy 2 of T4 slips)	01	
	Commissions per Box M on all T4 slips, included in above total	02	
	Adult training allowances, net research grants, tips and gratuities (see Guide—item 3 and specify)	03	
	Total employment earnings (total of lines 01 and 03)	04	
	Deduct: 3% of 'Total employment earnings' (line 04 above) — maximum $1150 (see Guide—item 4)	05	
	Other allowable expenses (see Guide—item 5 and specify)	06	
	Total employment expenses (total of lines 05 and 06)	07	
	Net employment earnings (line 04 less line 07)	08	
Pension Income	Old Age Security Pension ($1164.54 for year—for less than year, see Guide—item 6)	09	
	Canada or Quebec Pension Plan benefits (attach copy 2 of T4A (P) slip)	10	
	Other pensions or superannuation (attach copy 3 of T4A slips)	11	
Income from Other Sources	Unemployment Insurance benefits (attach copy 1 of T4U slip)	12	
	Taxable amount of dividends from taxable Canadian corporations (attach completed Schedule 4)	13	
	Interest and other investment income (attach list or completed Schedule 4)	14	
	Rental income (Schedule 7) Gross 15a	Net 15b	
	Net income from self-employment (complete applicable lines 69 to 79 on page 4)	17	
	Taxable capital gains or allowable capital losses (complete and attach Schedule 2)	18	
	Other income (see Guide—item 16 and specify)	19	
	Total Income (total of lines 08 to 19 inclusive, excluding line 15)	20	
Deductions from Total Income	Canada or Quebec Pension Plan Contributions (see Guide—items 23 and 24)		
	Contributions through employment per Box D on all T4 slips	21	
	Contribution payable on self-employed earnings (from page 3)	22	
	Total Contributions (total of lines 21 and 22)		
	Less: Overpayment of contributions (from page 3)	23	
	Allowable Deduction	24	
	Unemployment Insurance Premiums (see Guide—item 25)		
	Premiums per Box E on all T4 slips	25	
	Less: Overpayment of premiums (from page 3)	26	
	Allowable Deduction (line 25 less line 26)	27	
	Registered pension plan contributions (see Guide—item 26)	28	
	Registered retirement savings plan premiums (attach receipts)	29	
	Annual union, professional or like dues (attach receipts)	30	
	Tuition fees—claimable by student only (see Guide—item 29 and attach receipts)	31	
	Child care expenses (complete and attach Schedule 5)	32	
	Other deductions (see Guide—item 31 and specify)	33	
	Total of lines 24 and 27 to 33 inclusive	34	
	Net Income (line 20 less line 34)	35	
Deductions from Net Income	**Total Personal Exemptions** (complete details on page 4)	36	
	Standard deduction, Medical expenses and charitable donations		
	Claim either A or B, but not both (see Guide—item 39)		
	A — Standard deduction of $100.00	37	
	or B — The Total of Allowable Amounts below	38	
	Medical expenses (attach receipts and completed Schedule 3)	39	
	Less: 3% of 'Net Income' (line 35)		
	Allowable portion of medical expenses		
	Add: Charitable donations (attach receipts and completed Schedule 3)	40	
	Total Allowable Amounts		
	Non-Capital losses of other years (see Guide—item 42)	41	
	1972 Capital losses (see Guide—item 43)	42	
	Total of lines 36, 38, 41 and 42	43	
	Taxable Income (line 35 less line 43)	44	

Please do not use this area 45

130 416

Employee Overpayment of Contributions and Premiums

Calculation of Canada Pension Plan Overpayment (If you have contributory self-employed earnings, see below)

- The Employee's Canada Pension Plan Contribution Table is on pages 42 and 43 in the Guide.

Calculate Earnings Subject to Contribution at the right. If you became 18 or 70 years of age or received a retirement or disability pension under the Canada or Quebec Pens on Plan in 1973, e amounts shown must be prorated as noted Guide—item 24B.

	$	¢
Total Contributory Earnings per T4 slips (maximum $5,600)		
Less: Basic Canada Pension Plan Exemption of $600		
Equals: Earnings Subject to Contribution (maximum $5,000)		

	$
Total contributions deducted per Box D on all T4 slips	
Less: Required contribution—1.8% of 'Earnings Subject to Contribution' or amount per Contribution Table, maximum $90	
Canada Pension Plan Overpayment (Enter this amount on line 23 on page 2 and also as a credit on line 49 on page 1)	

Calculation of Unemployment Insurance Overpayment (See Guide - Item 25)

- Calculation I is to be used if your premiums were deducted at one rate throughout the year (that is, all 1% or all .6%).
- Calculation II is to be used *only* if your premiums were deducted at the two rates (1% *and* .6%).
- If the amount of the premium deducted by your employer is less than your required premium, *do not* include the difference with your return.

Calculation I

- Determine the total of your Insurable Earnings from Box H on all your T4 slips. If Box H is blank, use the amount in Box C.
- Compare the total of premiums deducted per Box E on all your T4 slips to the required premium found by reference to the Employee's Unemployment Insurance Premium Table on pages 44 and 45 in the Guide, using the applicable rate of 1% or .6% and the total of your Insurable Earnings (maximum $8,320). Record the result below:

Total premiums deducted per Box E on all T4 slips		(A)
Deduct: Required Premium per Premium Table		(B)
Unemployment Insurance Overpayment (If (A) is greater than (B))		

- If there is an overpayment, enter the amount on line 26 on page 2 and on line 50 on page 1.
- If there is *not* an overpayment, *no further action is required* (the allowable deduction on line 27 on page 2 will be the same amount as that entered on line 25).

Calculation II

Total Insurable Earnings per Box H or, if blank, per Box C on all T4 slips (maximum $8,320)		
Less: Insurable earnings subject to .6% premium per T4 slips (maximum $8,320)		(A)
Equals: Insurable earnings subject to 1% premium		(B)
Total premiums deducted per Box E on all T4 slips		
Less: Required Premium—.6% of Insurable earnings (A), or amount per Premium Table		
Required Premium—1% of Insurable earnings (B), or amount per Premium Table		
Equals: Total Required Premium		0
Unemployment Insurance Overpayment (Enter this amount on line 26 on page 2 and on line 50 on page 1)		

Canada Pension Plan Contribution on Self-Employed Earnings (See Guide—item 24)

		$
Contributory Self-Employed Earnings		
Add: Contributory earnings from employment per T4 slips		
Equals: Total Contributory Earnings *(If this amount is less than $900, no contribution is required on self-employed earnings.)*		
Deduct: Basic Canada Pension Plan Exemption of $600		
Equals: Earnings Subject to Contribution (maximum $5,000)		
Required Contribution (3.6% of 'Earnings Subject to Contribution': maximum $180)		
Deduct: Contributions through employment *(employee contribution per T4 slips)* (See 'Note' below)	x2 =	
Canada Pension Plan Contribution Payable on Self-Employed Earnings (Enter this amount on line 22 on page 2 and also on line 47 on page 1)		

Note: If the 'Contributions through employment' (multiplied by 2) exceeds your 'Required Contribution' you are entitled to claim an overpayment contributions equal to one-half of the amount of the excess.

Self-Employment

Type of business or profession

Principal commodity manufactured or sold, or service provided

Name of firm

Location of business (street, city and province)

Names of partners, if any

Location of farm — Total acreage — Cultivated acreage

Gifts

If, in 1973, you made a gift or gifts totalling more than $2,000 in value, a provincial gift tax return may be required not later than 30th April, 1974. For further information inquire at your District Taxation Office. (Prince Edward Island and Alberta do not levy a gift tax.)

4 Claim for Personal Exemptions **All specified details must be provided for each exemption claimed.**

- Net income of your spouse or dependants includes Old Age Security Pension and Supplement, Canada or Quebec Pension Plan benefits and Unemployment Insurance benefits—see Guide—item 32.
- If you were single, divorced, separated or a widow(er) in 1973 and supported a wholly dependent relative in the same dwelling in which you resided, claim the Equivalent to Married Exemption on Schedule 6.
- If you are claiming dependants other than spouse and children, claim the Exemption for Other Dependants on Schedule 6.
- If you are claiming dependants who did not reside in Canada, complete and attach form T1E-NR which you can obtain from any District Taxation Office.

Basic Personal Exemption — Claim $1600.00

Age Exemption—If you were born in 1908 or earlier — Claim $1000.00

If you are claiming this exemption, did you receive the Old Age Security Pension in 1973? Yes ☐ No ☐

Married Exemption — If applicable, check √ and claim item 1 or 2

Married on or before 31st December, 1973, and supported spouse in 1973

1. whose net income in that year, while married, was not over $300. ☐ — Claim $1400.00

2. whose net income in that year, while married, was over $300 but not over $1,700. ☐ — $ c 91

	$	c
	1700	00
Less: spouse's net income		
Claim		

Exemption for Wholly Dependent Children (A) Sons, Daughters or Grandchildren
(B) Certain Nieces or Nephews—see Guide—item 36

Children under age 16 at end of 1973—Claim $300 for each child whose net income was not over $1,100. If a child's net income was over $1,100 but not over $1,700, claim $300 **minus one-half** the amount by which the child's net income exceeds $1,100.

Children age 16 or over at end of 1973—Claim $550 for each child whose net income was not over $1,150 and who, if over age 21, was in full-time attendance at a school or university or was infirm. If a child's net income was over $1,150 but not over $1,700, claim $550 **minus** the amount by which the child's net income exceeds $1,150.

Do not claim here for a child you have claimed in the Equivalent to Married Exemption on Schedule 6.

Name of child (attach list if space insufficient)	*Relationship to you*	*Net income in 1973 $*	*Age in 1973*	*If over 21 in 1973, state school attended or whether infirm*

Other Exemptions

Additional Personal Exemptions per Schedule 6 attached. — 93

Disability deduct on for blind persons and persons confined throughout the year to a bed or wheel chair (see Guide—item 38A and specify to whom the claim relates) Self ☐ Spouse ☐ — 97

Education deduction for eligible students and, within limitations, for persons supporting such eligible students (see Guide—item 38B and state name of student) Self ☐ or — 99

Total Other Exemptions — D

Total Personal Exemptions (Enter this amount on line 36 on page 2)

Income from Self-Employment (Report both 'Gross' and 'Net'. See Guide—item 17)

	$	c	$	c	
Business income	Gross 10		Net 10		⊙
Professional income	Gross 11		Net 12		⊙
Commission income	Gross 13		Net 14		⊙
Farming income	Gross 15		Net 16		⊙
Fishing income	Gross 17		Net 18		⊙

Net income from self-employment (Enter this amount on line 17 on page 2) — 79

Form authorized and prescribed by the Minister of National Revenue. 132418

Additional Personal Exemptions (See Guide - items 32 to 37)

Schedule

For use by individuals claiming:

(a) equivalent to married exemption, or
(b) exemption for dependants other than spouse and children

- Net income of your dependants includes Old Age Security Pension and Supplement, Canada or Quebec Pension Plan benefits and Unemployment Insurance benefits.
- If you are claiming dependants who did not reside in Canada, complete and attach form T1E-NR which you can obtain from any District Taxation Office.
- If you were married and not separated from your spouse you cannot claim the Equivalent to Married Exemption.

Equivalent to Married Exemption

(If applicable, check (√) and claim item 1 or 2)

Single, divorced, separated or widow(er) and supported a relative in 1973

Exemption may be claimed for a relative (a) wholly dependent on you or on you and one or more other persons and (b) living in a dwelling **(in which you reside)** maintained by you or by you and such other persons of whom the dependant is also a relative. (You may claim here **only** if it has been agreed that no other person will claim for the same dependant or in respect of the same dwelling.)

If the address of a dependant differed from yours while attending school, provide the address where the dependant normally resides during the non-school portion of the year.

Did you maintain the dwelling where the dependant resided? Yes ☐ No ☐

Did you reside in the dwelling where the dependant resided? Yes ☐ No ☐

The answer to both of the above questions must be 'Yes' to claim this exemption.

☐ 1. Supported relative whose net income was not over $300. *Provide 'Details of Dependant' below and claim $1,400 — $

☐ 2. Supported relative whose net income was over $300 but not over $1,700.

	$	¢
	1700	00
Less: dependant's net income		
*Provide 'Details of Dependant' below and claim		

*Details of Dependant

Name _____ *Relationship to you* _____

Address _____ *Age in 1973* _____

Exemption for Other Dependants

(A) Parents, Grandparents, Brothers or Sisters (including in-laws)
(B) Aunts or Uncles Resident in Canada (including in-laws)

Provide details below and claim actual amount spent in 1973 in support of each dependant but not exceeding the allowable maximum determined according to the dependant's age and net income, as follows:

Under age 16 at end of 1973 – If net income was not over $1,100, maximum claim is $300.
– If net income was over $1,100 but not over $1,700, maximum claim is $300 **minus one-half** the amount by which the net income exceeds $1,100.

Age 16 or over at end of 1973 – If net income was not over $1,150, maximum claim is $550.
– If net income was over $1,150 but not over $1,700, maximum claim is $550 **minus** the amount by which the net income exceeds $1,150.

If any other person has also contributed to the support of a dependant listed here, the combined amount claimed by you and such other person must not exceed the maximum amount determined as above. No claim may be made here for (a) a dependant over age 21 who is not mentally or physically infirm (unless that dependant is a brother or sister in full-time attendance at a school or university) or (b) a dependant in respect of whom you have claimed the equivalent to married exemption.

Dependants	*Date of Birth* Day	Month	Year	*Relationship to you*	*Net income in 1973* $	*Amount spent by you in support of dependant* $	*If over 21, state whether infirm or state school attended in 1973*
(1) Family or Last Name / *Usual First Name* / *Address*							
(2) Family or Last Name / *Usual First Name* / *Address*							

Total of Additional Personal Exemptions *(Enter this amount on line 66 on page 4 of your return)* ____

(5) 3. Circle the best answer for each of the following:

1. Every Canadian must file an income tax return if his income is over -

   a. $ 100
   b. $ 550
   c. $ 1100
   d. $ 1600

2. Which of the following cannot be deducted from your Total Income, when calculating your Net Income.

   a. Unemployment Insurance premiums
   b. Union dues
   c. Medical expenses
   d. Tuition fees

3. Which item would not be part of your Personal Exemptions.

   a. a child over sixteen
   b. a child whose income was $ 1,150
   c. a wife whose income was $ 1,550
   d. child care expenses

4. Taxable income is:-

   a. The amount of federal tax to be paid
   b. Your total income
   c. The amount of income on which you pay tax
   d. Net income after taxes

5. The B.C. provincial tax rate is what percent of the federal rate -

   a. 10 %
   b. 17.5 %
   c. 22 %
   d. 30.5 %

MATHEMATICS

UNIT VI: CONSUMER MATH.

ITEM C : BANKING AND BORROWING

Do the work listed below for each objective and check off each step as you complete it.

OBJECTIVES

The student must be able to:

1. Identify the various services available from banks, trust companies, credit unions, finance companies, etc.

   a. Saving money
      - savings accounts and interest
      - bonds and stocks
      - pension plans
      - safety deposit boxes

   b. Spending money
      - chequing accounts
      - money orders
      - travellers cheques

   c. Borrowing money - loans

2. Calculate and use simple interest with the formula:

   $I = PRT$, where:

   I = the interest charged
   P = the principle amount
   R = the rate of interest charged
   T = the amount of time in years

   and: $P = \frac{I}{RT}$, $R = \frac{I}{PT}$, $T = \frac{I}{PR}$

3. Identify the various forms of credit, such as charge accounts and credit cards, along with their advantages and disadvantages.

4. Compare the cost of financing available from different institutions to determine the best arrangement for you.

LEARNING RESOURCES

Books: B Math, Pitman
General Mathematics, Ginn and Company
Refresher Mathematics, Stein

Booklet: Your Money Matters, Royal Bank of Canada
Banking and Borrowing, information sheet

Filmstrips with cassette tapes:

Cash and Credit, Eyegate
Just Sign Here, Eyegate

LEARNING ACTIVITIES

Start by reading pages 26-40 in the booklet "Your Money Matters" for some general information on banking and borrowing. Then read the booklet on "Banking and Borrowing". The next step is to turn to page 83 in B-Math and read to the top of page 85. Then do numbers 1, 4, 8, 15, 18, 28, and 33 in exercise 4-1 on page 85. Read about simple interest on page 87 and 88. Then do numbers 1, 4, 7 and 9 on page 88. Do problems 22 and 23 on page 87, problem 3 on page 91, and problem 4 on page 92. Be sure to check your answers. (Pages 94-107 and 110-112 may be read if you want more information on borrowing money--but this information will not appear on any tests). Read page 108 and the "example" on page 109. Read about "installment buying" on page 555 and 556 in Refresher Mathematics. Do questions 1 and 3 on page 556.

Finally get together with any other students who are on Item C and watch the films "Cash and Credit" and "Just Sign Here". These are filmstrips which have cassette tapes to go along with them. Use the DuKane projector. See the questions at the end of the filmstrips, look over the Objectives and discuss how you would meet these Objectives.

If all your work is correct to this stage, you are ready to write Item Progress Check VI C, Form 1. If you make the criterion you are ready to go on to Unit VI, Item D.

If you do not make the criterion on the Item Progress Check, or if you have had difficulty with the above questions, use one or more of the following:

Objective	Source Materials	Page(s)	Content
1	Refresher Mathematics	565, 566	information & exercises (savings and checking accounts)
1	"	570-572	information & exercises (borrowing money)
2	"	567-569	information & exercises
1	"	576-579	information and exercises(stocks and bonds)
1	General Mathematics	423-428	information & exercises
2	"	428-433	"
1,4	"	434-437	"
3	"	418-419	"
2	Mathematics, A Basic Course	172-176 179-182 184-185	" " "

Now check with your instructor and do Item Progress Check VI C, Form 2. If you meet the criterion, go on to Unit VI, Item D. If you do not, discuss your difficulties with your instructor.

REPRINTED FROM - YOUR MONEY MATTERS - THE ROYAL BANK OF CANADA

4284

HANDLE WITH CARE

While most people are capable of using credit facilities in a responsible and intelligent manner, it must be acknowledged that there is a minority who never quite get the hang of credit. While they are enchanted with the idea of Buying Now, the part about Paying Later tends to be ignored until it arrives as an uncomfortable shock. This is especially true if they have entered into a No-Down-Payment-First-Installment-In-Six-Months type of credit deal.

Or they may simply try to have too much of a good thing. They pledge more than they can handle in monthly payments on a car, a color TV, new furniture, appliances. In short, they lose control of their credit commitments, and their lives become a desperate scramble to meet their payments. Given this state of affairs, all it takes is a financial set-back or an unexpected emergency, and the person who has already overextended his resources can be in trouble.

Other people pay more than they have to for the credit they use. An astonishing number of people seem unaware that credit is a commodity like any other, and that they can shop around to find the best credit deal. There are different sources of money available to suit different purposes. The interest or carrying charges to be paid (the cost of using other people's money while you postpone using your own) can vary widely from source to source.

Credit users who do not shop wisely for credit can actually end up paying more for the use of the money than for the merchandise itself.

FIRST PRINCIPLES OF INTEREST

There is a variety of credit facilities through which you can 'rent' money for a specified time, in order to buy the things you need today. You can use charge accounts, or credit cards, or you can obtain cash loans from banks, insurance companies or loan companies. In a pinch, of course, there are always personal loans from friends or relatives.

Then too, if you need cash in a hurry, you can always take your watch to the local pawnbroker. He will probably give you about one third of the present cash value of your timepiece, and make a charge for this service. He will also set a time limit, during which you may redeem your watch by re-paying the cash you have received plus the charge for the loan.

If, by the end of this time limit, you can't raise the cash to redeem your watch, the pawnbroker is then entitled to sell it to recover the money he loaned you.

Your watch was given to him as "*collateral*", a form of security against the possibility of your being unable to repay the loan. In most lending transactions some form of security is required, by the lender, and he is entitled to seize this collateral, if the borrower defaults on repayment.

Pawning your valuables is not the most sophisticated, nor the most economical way to raise money. Nevertheless it provides a good illustration of the basic way in which all credit transactions work. The only real difference between the various forms of credit lies in the kinds of security that a borrower, or credit-user, is obliged to provide.

In some credit transactions, the credit-user is not asked to furnish anything tangible in the way of security, or collateral.

For example, when you're applying for a department store charge account, or an oil company card, the only security you need is your personal reputation.

A record of meeting your financial obligations promptly and fully, is your most valuable credit asset.

RETAIL CREDIT

Many stores also offer 'free' credit in the form of open-accounts, or *Charge Accounts*, as they are more commonly called.

Both large department stores and small neighborhood groceries will let you shop without cash, deliver your purchases free, and bill you at the end of the month. They will do so without any mention of interest or carrying charges.

Your next door neighbor shuns this kind of shopping. She is convinced that she spends less to buy more at the nearby supermarket which operates on a strict cash-and-carry basis. Moreover she prefers to either bring her purchases home herself, or if absolutely necessary, to pay a small delivery charge. She insists that she saves two or three dollars a week by avoiding these 'free' services.

She very likely does. It costs your corner grocer money in salaries etc., to give you such convenient personal service, and although it may not be obvious, you are paying for that service. In stores offering this kind of convenience the prices will probably be consistently higher than the prices charged by stores which conduct all transactions in cash.

Ninety Interest-Free Days is another form of retail credit, and one which is often offered by furniture and clothing stores.

Again, if you compare prices, you'll probably find that the term 'interest-free' is a little misleading, and that you are paying something extra for the privilege of not paying cash immediately. Even so you may still find it worthwhile to pay a slightly higher price for the convenience of having your total payment neatly divided into three equal monthly installments.

Ninety days is just about as long as you will be allowed to stretch payments without being asked to pay a specific amount of interest or carrying charges. After ninety days your credit will probably cost you a minimum of $1\frac{1}{2}$ percent of the unpaid balance of your bill every month.

This $1\frac{1}{2}$ percent monthly charge is the going rate for most *Revolving Credit Accounts*.

This kind of account is offered by many large stores, along with the company's shopping card, to people whose credit applications have been approved. A credit limit is arranged, based on your need and on your ability to pay. You are then allowed to make purchases, as and when you want, so long as the total you owe the store does not exceed your set limit.

You pay for these purchases gradually with regular monthly payments. The size of the payments is worked out in relation to the total outstanding balance. Included in your monthly payments is a clearly stated service charge, $1\frac{1}{2}$ percent per month interest, calculated on your unpaid balance. This interest charge amounts to 18 percent per year.

The yearly *rate* of interest remains constant. But, as you gradually reduce the outstanding balance, the *amount* you pay in interest each month, in dollars and cents becomes smaller. Most stores insist on a minimum monthly payment. Of course, if you want to pay more than the minimum, or indeed pay off the entire balance, you are free to do so. If you pay more than the minimum, you are lowering the dollar cost of your credit.

The faster you pay off any form of Revolving Credit Account, whether department store or credit card, the less money you will be paying for the convenience of using that credit.

Conditional Sales Contracts are used to handle purchases where the goods you are buying cost more than your established credit limit on your *Revolving Account*. They can also be used when you are purchasing an expensive item at a store where you don't have a Revolving Credit Account, and don't particularly want to open one.

Suppose you are determined to completely outfit yourself for skiing this year, but you don't have the $500 cash to buy all the equipment outright. You can probably arrange a Long Term Payment Plan with the retailer, what some stores call a Budget Account.

Typically, such an agreement might call for a downpayment of the sales tax, and a signed Conditional Sales Contract promising 36 monthly payments of *$17.58*, for the balance. The balance in this case would include the purchase price of $500, plus accumulated interest and carrying charges of $132.88.

Because you have had other dealings with this particular company, and because they welcome your credit business, it might not occur to you that there could be a cheaper way to buy your equipment with borrowed cash.

If you explore the possibilities of a low-cost loan (see page 13), borrow the necessary cash, and pay for the ski equipment in full, you might save yourself quite a lot in carrying charges.

Re-possession Is Nine-Tenths of The Law

When you buy goods on a Conditional Sales Contract, you must keep up your payments as per your contract, or the company or store issuing the contract can re-possess the goods.

Remember—when you sign a Conditional Sales Contract, the goods are not legally yours until after the final payment has been made. You would not own your complete ski rig until after the 36th payment.

Suppose you make your first six payments according to plan, and then some unexpected financial crisis intervenes, and you are unable to pay any more. In most instances, the retailer, if he were so inclined, would have every legal right to re-possess the equipment. He would then be free to sell it to recover the money he lost on the broken contract, and also the cost of getting the goods back.

What Your Retail Credit Contract Should Tell You[1]

1) Exactly what you are buying. A clear description of the goods or services being purchased.
2) The actual cash price of what you are buying. Installment or delivery charges should also be notated, but separately. In the case of a loan, the principal amount of the loan should be set down.
3) The amount of your downpayment. In the case of a trade-in the contract should record the exact value of your traded-in car, TV, etc.
4) The difference between the cash price of your purchase and your downpayment, or your downpayment plus your trade-in value.
5) The exact amount of credit-finance charges to be paid on the balance, expressed both in dollars and as an annual percentage.
6) The exact amount it will cost for insurance and service charges.
7) The total amount of debt to be paid.
8) The amount, the due dates, and the frequency of installment payments.
9) The basis on which additional penalty charges will be made in the event that you default on payments.

[1] *All sellers are obliged to disclose the exact amount of credit finance charges to be paid on the balance, expressed in both dollars and as an annual percentage*

CREDIT CARDS

Another widely-used form of credit is the credit card. Any credit card transaction is actually an invisible form of cash borrowing. In many cases the credit card represents a three-way arrangement between the cardholder, the merchant, and the company or bank which issues the card.

When you buy something with a credit card, and sign the sales slip, you are in effect, instructing the company or bank to pay your bill for you. You are also promising, at the same time and with the same signature, to repay the company or bank who have paid the merchant for your purchases.

There are a great many advantages to today's 'plastic money'. Credit cards are safer and more convenient to carry about than cash, especially when you are travelling. If a card is lost, usually a phone call to the issuing company terminates all your obligations for the card immediately. Since you keep one copy of any sales slips you sign, they provide proof of purchase for business expenses, for income tax returns and for your personal bookkeeping records. They also give you additional buying power, in the form of revolving credit, sometimes with and sometimes without, carrying charges.

All this convenience should not obscure the fact that with credit cards, just as with every other form of credit, there is a day of reckoning. The banks, the oil companies, the stores and the other establishments that issue credit cards all expect to be paid promptly, and sometimes in full, when they send you their monthly statement.

Perhaps credit cards might more usefully be called payment cards. That way, it would be easier to remember that this kind of transaction only *begins* with your signature. It is not completed until your bill is finally paid.

It Pays To Read The Small Print

There are various kinds of cards with various uses, rules for payment, and rates of interest. In some cases, you'll find this information in microscopic print on the back of the card itself. In others, it's spelled out in the accompanying literature. However it's presented, be sure to read it carefully. It's important to know what obligations you are taking on with the card, as well as what privileges. As in most contracts the most important reading is sometimes in small print.

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DIRECT LOANS

No Thanks, I'm Just Browsing

Sometimes you may find yourself in need of a cash loan, rather than any of the other forms of credit. Let us say that owing to an emergency, or in order to seize a business opportunity, you must have a substantial amount of cash. Where shall you borrow it, and how much should it cost you?

Once again, a certain amount of judicious shopping around is in order before you decide where you would like to borrow the money. Many different organizations offer cash loans, and the terms and conditions of borrowing can vary widely from source to source. If you are a good credit risk, any number of organizations will be happy to loan you money. The problem is to sort them out to determine who will let you have the money you want, for the period of time that suits you best, at the most reasonable cost.

Present-day disclosure legislation provides that in any loan transaction the calculating interest rate must be shown, both in dollars and cents, and as a percentage figure. Even disclosure legislation has inevitably got loopholes. Therefore when you are offered a very low rate of interest on a loan, examine the deal very carefully to make sure there is no way extras can be added, without your consent.

Disclosure of the cost of borrowing comes under Provincial jurisdiction, and applies to all lending and credit institutions except banks. The banking system is under federal legislation.

Who Will Lend You Money?

Let's say you need to raise $2,000 to bail you out of an unexpected emergency. There are several likely sources you can consider:

1 Your Bank

It is a prime function of your bank to lend money. If you look through the list of its services you'll find that aside from personal loans, there are many different kinds of loans available, geared to different needs. Some loans for example like University Tuition Loans, provide for extra-long repayment periods.

If you do borrow your $2,000 from the bank, you may wonder what will happen to your interest charges if you read in the newspaper that the "prime" rate has gone up or down. The "prime" rate is the lowest interest rate that the bank will charge to its best, and therefore its least risky customer.

Most bank consumer loans are at a fixed rate which is not immediately affected by fluctuation in the prime rate. Eventually, changes in market interest rates will be reflected in new consumer lending rates. Your bank will inform you of any change in a rate which has already been contracted. (The prime rate should not be confused with The Bank of Canada rate, which merely reflects shifts in the government's overall monetary policy.)

Bank consumer loans are usually one of the lowest cost sources of credit. Remember that ski outfit you were determined to buy? If you were able to borrow the $500 at a bank, the 36 monthly repayments would amount to $16.61, and the total interest charges would amount to $97.96.

2 Credit Unions, Caisses Populaires

These are co-operative organizations which accept and invest members' savings. They also offer personal loans, at a rate of interest comparable to those offered by chartered banks. However the amount you can borrow with complete ease is usually tied to the value of the shares you hold in the organization. If you need to borrow an amount in excess of that, you may have to put up some additional security or find someone to co-sign for your loan.

A word about co-signing or endorsing. Think carefully before you do. If the person who wants you to co-sign for him is someone to whom you'd lend your own money, if you had it, okay. Just remember that co-signing a loan involves the same risk as lending your own money. If the borrower defaults, the co-signer is responsible for the outstanding amount of that loan. What sometimes starts out as a simple favor for a friend, can end with the friendship destroyed, and you holding a rather substantial bag.

3 Savings Bank, Trust and Mortgage Loan Companies

You should be able to arrange a loan at any of these, using your personal savings as security. You could, of course, take out your savings, and use them to meet your emergency. Cash is, after all, the cheapest way to pay for anything. But this may only be advisable if those particular savings were already earmarked for that specific purchase. If your savings represent a tortuously-saved nest egg, you might be better off to leave it where it is, and borrow against it. Most people find it easier to repay a loan than to rebuild a savings account.

4 Life Insurance Company

If you have a life policy with a cash surrender value, you ought to be able to borrow up to 95% of that amount, at an attractive rate of interest. Remember, however, that by using your policy as security, you are reducing your family's protection by the amount of that loan.

5 Consumer Loan Companies

These are often inaccurately called "finance companies". Finance companies often do operate consumer loan companies, but their real business is not directly with the borrowing public. They work primarily with the retailers who offer cars, appliances, boats, etc. on time payments.

Consumer loan companies will lend you money on the strength of your signature alone. But you can be sure that you will be thoroughly investigated first, and you may be asked to sign a Chattel Mortgage (in provinces where such security can be taken and registered) before you get your money. Such a mortgage requires that you put up as security your car, furniture or other property.

The Canadian Small Loans Act regulates the interest that may legally be charged on loans up to $1,500. Because they undertake greater risks, consumer loan companies may charge 2% a month (24% a year) on the first $300 of the unpaid balance, 1% a month (12% a year) on the next $700, and ½% a month (6% a year) on the final $500. Consumer loan companies loans larger than $1,500 are not regulated in Canada. Consequently, interest rates on such loans may be considerably higher than 24% a year.

6 Pawnbrokers

As a last resort, and providing you have something valuable to pledge, there is always the pawnbroker. However to raise $2,000 this way, you would have to own something that was not only worth $6,000, but small enough to store in the pawn shop. Even if you could meet this rather unusual requirement,

you will probably find this an expensive way to borrow money, when the time comes to redeem your property.

7 Loan Sharks

Even as a last resort you are best advised to avoid the loan sharks. These are the people who offer short term loans, at exorbitant rates of interest, with your continued good health as security. A typical deal from a loan shark is the '6 for 5' payday loan, where for every $5 borrowed, $6 must be paid back in a week—a staggering interest rate. These shady operators can most charitably be described as criminals. Avoid them.

APPLYING FOR CREDIT

When you ask for credit, you will probably be asked to provide the following information:

- Your name, age, address and phone number.
- Your marital status. A list of your dependents.
- Whether or not you and your spouse are separate as to property (if applying in Quebec).
- The name and address of your landlord or mortgage holder.
- The length of time you have lived at your present address.
- Your previous address.
- The name of your nearest living relative.
- Your occupation and your place of employment.
- How much you earn.
- Your spouse's place of employment, and how much he or she earns.
- What you own.
- What regular payments you are already making.
- The name and address of your bank.
- Whether there are any judgments or legal proceedings against you.

agree to pay off the balance in 24 months. How much will the financing of the new set cost?

First, the amount of money you borrowed is ($699.95 − $150) = $549.95.

You agreed to pay $30.60 for 24 months—a total of $734.40.

Subtracting the amount of money borrowed from the total to be repaid gives $184.45. That is the dollar cost of the credit.

IN YOUR OWN GOOD TIME

Since time is money, especially when applied to credit, it is important to consider the time element carefully. This is true, whatever form of credit you are considering, retail credit, credit card, or a direct loan. The time element should be evaluated from three different angles:

First, think about the time you want to take to pay for your purchase, or repay your loan. In this context, time is quite literally, money. Every month where there is still an outstanding balance to be paid, will cost you a certain amount in interest. The larger your repayments, the quicker your debt will be settled, and the less your credit will cost.

However, on your budget, you may find it easier, to make smaller payments over a longer period of time. On this basis, you may decide that it is worth the extra cost of the credit to keep your monthly expenditures in line with your monthly income. Therefore, even though you would be paying more this way, it's still the best buy for you. The choice is yours.

Second, consider when during the month it is most convenient to make your regular payments. If one of the two paycheques you receive each month is already heavily committed to rent, phone and heating bills, it will probably be advisable to make your new car payments out of the other cheque.

When a credit-granter asks you when you would like to make your first payment, he is really asking you to name the day of the month on which you prefer to make your monthly payments. Think about it carefully, in relation to your other payments, and in relation to your pay-days. It is possible, though somewhat complicated, to have your payment schedule re-arranged after you have started paying. It's a lot less trouble if you get it right the first time.

Third, and finally, consider the time element as it applies to the useful life of the object you are buying. Nothing is more depressing than continuing to make payments on an article long after it has gone to the junkyard.

The Other Side of the Coin

Now it is time to examine the other side of the coin—the money you save or invest. Just as you work to earn the money you spend, the money you save and or invest can be made to work for you. Just as you need specific knowledge about the money at your disposal to manage your resources efficiently and establish your spending priorities, so you need to understand some basic concepts of investment in order to put to work for you the money you don't spend immediately.

Ways and Means

There are many ways to get money. Most of us sell our services, either for wages, salaries or fees. Some of us win it. Some inherit it. Some get it in other ways.

But once you've got it, there are only two ways to make it work for you. You can lend your money in such a way that it earns interest. Or you can buy something that itself produces income. These two distinct forms of investment involve *debt* securities and *equity* securities. When you *lend* your money, you are creating a *debt* for someone else. The borrower must promise to pay back your original loan at a specified time in the future, plus something extra—called interest—for the privilege of having the use of your money over a period of time.

When you deposit your savings with a bank or trust company, those institutions are *indebted* to you. When you buy a bond from the government or from a corporation, you are essentially lending your money in return for their IOU—their promise to repay the debt, with interest.

On the other hand, you can also buy a "piece of the action." You get no guarantee that your money will be returned safe and sound. But, in return for your money, you get something tangible—part ownership in the venture, whatever it is. This is called *equity* investment. If it is successful, you may stand to make a high return over and above your original investment. If it is not, you may lose all or part of it.

When you buy a common stock in the stock market, the certificate you get from the company indicates that you own part of the company. You have a say in how it's managed, and you have the right to share in its fortunes—good or bad. When you buy a piece of land, or a house, you are exchanging your money for some visible property, which may go up or down in value.

SOCKING IT AWAY—YOUR SAVINGS

From Little Acorns

There is no short cut to saving money. Probably the most effective way to save is simply to put away small amounts regularly. You can, for example, estimate roughly how much of your income you can afford to save, and then decide to put 5, 10, or a greater percent of every pay cheque into savings. You can decide to put away half, or more of every windfall that comes you way in the form of bonuses, etc.

A Penny Saved is a Penny Loaned

Your money works for you, to make more money, by earning interest. Once you have worked out your money-management plan, and have decided on a regular savings program to go along with it, you'll naturally want to get the highest interest you can. Remember that when you "save" your money anywhere other than under your mattress, you are really lending it to someone else, usually an institution like a bank or a trust company. Some institutions will pay you more for the privilege of borrowing your money than will others.

Savings accounts, for example, give you top safety, liquidity and convenience. Your money deposited in a savings account is safe—you can be sure of getting back at least what you put in, and getting it back on very short notice, if not immediately. Little research needs to be done to open a savings account. There is no cost. On the other hand, there is no possibility that your investment will grow over and above the interest it pays—there is no capital gains potential.

Savings accounts pay you less than you can get elsewhere. This is because institutions which offer savings facilities play the part of a middleman. Savings institutions, like banks and trust companies are called *intermediaries*—they take your money and invest it in things, like mortgages, bonds and loans. So they have to pay you less than they get to cover their expenses and make a profit themselves.

At different times, each of us can be borrowers or lenders. In fact, we can be borrowers and lenders at the same time. When we deposit money in a savings account, we are, in effect, setting aside present purchasing power for future use. We are indicating that we have some cash we don't need for immediate purposes. So we lend it to the savings institution and are paid interest for the use of our money.

When, on the other hand, we borrow money to buy a car, to finance the mortgage on a house, we are shifting purchasing power from the future to the present. We borrow someone else's money (or maybe even our own) and pay for the use of it.

Savings accounts are offered with or without chequing privileges. Accounts without chequing privileges pay higher interest rates than those on which you can write cheques, partly because they cost the institution less to administer. (See term deposits.) But interest rates and services offered vary from company to company.

For example, banks generally offer you the same, relatively low interest rate on a savings account with chequing privileges. In recent years that rate has fluctuated on one side or other of 3 percent. Most banks calculate the interest your money has earned twice a year. In other words, your interest is "compounded semi-annually".

For every $100 you have in your account each quarter year, you are allowed to write one free cheque. This doesn't mean you don't have to pay out the money when the cheque is cashed. It simply means that the bank won't charge you a fee for their work in processing your cheque. Ordinarily, you pay a 20 cent service charge for each cheque you write.

Trust companies' savings accounts more often than not pay slightly higher interest rates than do banks. This is because trust companies perform somewhat different functions than do banks. Trust companies, by and large, invest more of their money in mortgages than do banks. Because mortgage yields are higher than the average yields on the kinds of investments banks make, trust companies can afford to pay higher rates on their savings accounts.

In addition to savings accounts, banks offer *term deposits* and trust companies offer *guaranteed investment certificates*. They provide a higher yield, but less liquidity and convenience. Again, the capital gains potential is zero, and the safety factor remains very high.

Term deposits at a bank can vary from 15 days to five years, with varying minimum amounts required. Interest rates usually increase as the term increases. You can get your money out before the term is up, but only with an interest penalty.

Trust companies offer *guaranteed investment certificates* which have a higher yield than term deposits, but they are very difficult to cancel. Your money is "locked-in" until the date of maturity. If you do cancel them, the interest penalty is high. Therefore they rank low in liquidity.

Canada Savings Bonds are offered by the federal government, usually every November, for a limited period of time. Generally speaking they offer interest rates comparable to the longer term yield of guaranteed investment certificates, but have the added advantage of instant liquidity—they can be cashed anytime for full face value plus accumulated interest up to the month of cashing. Minimum investment is now $50, maximum, $25,000. Canada Savings Bonds are guaranteed by the Government of Canada. They are, therefore, as safe as the country itself.

PENSION PLANS

Pension plans rank with homes and cars as one of the major investments any person can make. Most people can live out their entire lives with great joy and satisfaction even if they have never owned their own car or home. But few of us could live a satisfying life after we have stopped earning money without benefit of an income from some other source.

It is important to consider, while we are still relatively young and earning, what kinds of provisions we can make to ensure that in our non-earning years we have at least enough money to live out our lives in relative comfort.

The federal and Quebec government have set up compulsory pension plans to which almost all employers and employees must contribute. The government also encourages employers to provide additional private pension schemes for their employees by allowing tax exemptions for contributions to employee pension plans, or *superannuation* plans, as they are sometimes called.

Most pension plans in Canada are either insured through a life insurance company, or administered by trustees who invest your contributions and carry out the necessary pension plans.

Once you accept employment with a particular firm, you may have little or no voice in the kind of pension scheme that goes (or doesn't go) with the job. If a pension plan is important to you, here are some of the features you should look at.

Retirement Age

Most pension schemes in Canada specify age 65 as the age at which you will retire with full pension benefits. In some plans, the retirement age is younger.

Mathematics Item Progress Check

UNIT VI: CONSUMER MATH Name: _____

ITEM C : BANKING AND BORROWING Date: _____

Form 1

Criterion:	9 /11
Score:	___/__

Problems: In the space below, show the work you do to solve problems. One mark is for your work, and one mark is for the correct answer.

(2) 1. If you put $150.00 in the bank on January 2, 1972 and earn 4% annual interest, what amount will you have on:

June 30, 1972? _____

December 31, 1972? _____

(2) 2. George borrowed $500.00 from his bank. If he has not paid anything on the loan for 4 years, how much interest will have accumulated. (The interest rate is 12% per annum.)

(2) 3. A customer purchases a TV set for $400.00 on the deferred payment plan. He gives a down payment of 10% of the purchase price and pays the balance in 30 monthly installments of $15.00 each. Find the amount of the carrying charge and the total cost (including charges) of the stereo.

(5) 4. Circle the best answer for each of the following:

1. The highest rates of interest for loans are normally charged by-

   a. banks
   b. consumer loan companies
   c. credit unions
   d. life insurance companies

2. An example of an all-purpose charge card is -

   a. Diners Club card
   b. Standard oil card
   c. Carte Blanche card
   d. Chargex card

3. If you cannot meet a payment on something you have bought on credit, you should-

   a. call your creditor
   b. flee the country
   c. take out a loan
   d. turn in your credit card

4. When you buy goods on a Conditional Sales Contract, the goods are legally yours when you have-

   a. paid a down payment
   b. paid the first monthly payment
   c. paid half the payments
   d. paid all the payments

5. If you invest $100.00 for 3 years at 7 % interest you would receive the greatest returns if-

   a. your investment was using simple interest
   b. your investment was using compound interest
   c. you invested in a bank
   d. you invested in Canada Savings Bonds

Mathematics Item Progress Check

UNIT VI: CONSUMER MATH Name: _____

ITEM C : BANKING AND BORROWING Date: _____

Form 2

Criterion:	9 /11
Score:	___/___

Problems: In the space below, show the work you do to solve problems. One mark is for your work, and one mark is for the correct answer.

(2) 1. If you had a balance of $142.00 in your savings account the last half of 1972, how much interest would you get at a rate of 4% annually for the period July 1 to December 31, 1972?

(2) 2. Mr. Wilson borrowed $450. from his bank at 10% interest. If he paid the loan off plus interest 1 year later, how much did he have to pay the bank?

(2) 3. Bill purhcases a stereo set for $300. and makes a down payment of $50.00. The balance is paid in 24 monthly installments of $14. each. Find the amount of the carrying charge and the total cost (including charges) of the stereo.

(5) 4. Circle the best answer for each of the following:

1. The highest rates of interest for loans are normally charged by-

   a. banks
   b. consumer loan companies
   c. credit unions
   d. life insurance companies

2. An example of an all-purpose charge card is -

   a. Diners Club card
   b. Standard oil card
   c. Carte Blanche card
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   a. your investment was using simple interest
   b. your investment was using compound interest
   c. you invested in a bank
   d. you invested in Canada Savings Bonds

MATHEMATICS

UNIT VI: CONSUMER MATH

ITEM D : OPERATING A HOME

Do the work listed below for each objective and check off each step as you complete it.

OBJECTIVES - You must be able to....

1. Determine the cost of buying a house, given information such as the:
   a. down payment
   b. amount and cost of mortgage
   c. property taxes

2. Calculate the cost of operating a house considering the following:
   a. interest charges on the mortgage
   b. property taxes
   c. insurance
   d. utilities (phone, light, heat, etc.)
   e. appliances (stove, fridge, etc.)
   f. repairs

3. Determine the cost of renting a house or apartment given information such as:
   a. rent
   b. type of agreement (i.e. lease or verbal agreement)
   c. utilities (usually only phone and light)
   d. special restrictions (i.e. security deposits)

4. Given a situation, determine the best arrangement - whether to buy or to rent, and explain why..

LEARNING RESOURCES

Books: B Math, Pitman
Refresher Mathematics, Stein
B.C. Landlord-Tenant Relations, Rush

Booklets: Operating a home, information sheet

Filmstrip with cassette tape:

The New Home, Eyegate

LEARNING ACTIVITIES

Start by reading the booklet on "Operating a Home". Then read pages 243-246 in B Math. Read pages 563-564 and do questions 1, 2 and 3 on page 564 in Refresher Mathematics. Then read pages 418 and 419 and do questions 3, 4, 5 and 7 in General Mathematics. You may also read the booklet "B.C. Landlord-Tenant Relations" for information on the B.C. Landlord-Tenant Act. (This is for your own information - it will not be tested. It could be discussed if you are working on this unit in small groups.)

Finally get together with any other students who are on Item D and watch the film "The New Home". This is a filmstrip which has a cassette tape to go along with it. Use the DuKane projector. See the questions at the end of the filmstrip, look over the Objectives and discuss how you would meet the Objectives.

If all your work is correct to this stage, you are ready to write Item Progress Check VI D, Form 1. If you make the criterion, you are ready to go on to Unit VI, Item E.

If you do not make the criterion on the Item Progress Check, or if you have had difficulty with the above questions, use one or more of the following:

Objective	Source Materials	Page(s)	Content
2,3	Refresher Mathematics	551-553	information & exercises (utilities)
2	"	559	information (fire insurance)
2	"	561,562	information (taxes)
1,2,3,4	"	563-564	information & exercises

Now check with your instructor and do Item Progress Check VI D, Form 2. If you meet the criterion, go on to Unit VI, Item E. If you do not, discuss your difficulties with your instructor.

REPRINTED FROM - YOUR MONEY MATTERS - THE ROYAL BANK OF CANADA

A ROOF OVER YOUR HEAD (BUT WHOSE?)

To Buy or To Rent

Canada has often been described as a nation of homeowners. Many, if not most Canadians, aspire to own their own homes. The acquisition of a self-enclosed dwelling often holds a place of highest priority in the average Canadian family's financial plan for the future. There is little doubt that the family who owns their own home enjoys certain status advantages over the family living in rented accommodation. There is a widely-held conviction that homeownership represents a sound business investment, while renting is wasteful and self-defeating.

Well, should you buy or rent?

The fact is that from the standpoint of getting value for your money, both owning and renting have distinct advantages and disadvantages.

Owning your own home provides you with a fairly good hedge against inflation. Real estate values tend to rise along with other prices. At first glance anyway, this would seem to make homeownership a good investment.

But what many aspiring homeowners tend not to realize fully is that owning a home is as much of an expense as it is an investment. When you rent your dwelling, your responsibilities end with the payment of your monthly rent. Homeownership brings with it the "privilege" of paying for repairs, maintenance, landscaping, heat and other expenses. It also means that you must assume the burden of paying yearly property and water taxes. In keeping with the "purchasing agent" concept, getting value for *your* money means that only you are in a position to decide where money considerations are balanced or outweighed by the non-monetary objectives necessary to achieve your own unique lifestyle.

While it is true that money spent on rent, is in a sense money "down the drain," the investment advantages of homeownership are perhaps not so clear-cut as they may seem at first. Only a certain portion of your monthly mortgage payment as a homeowner goes to increasing your equity in your property. The rest will be applied to paying the interest on your mortgage loan. If you have had to take on a very large mortgage, or if your mortgage terms are not advantageous, the portion of your monthly payment that can be considered actual investment may be disappointingly small.

All this must be weighed against the undeniable privilege and pleasures of homeownership; the sense of privacy and security that lies in possessing your own domain; the freedom to alter and improve your surroundings to suit your own needs and your own tastes; in a word, none of the restrictions and annoyances that are an accepted part of the daily life of the apartment or flat or duplex-dweller.

Should you buy or rent? How much should you spend on buying a new home, or in renting a new apartment? What portion of your income should go towards housing? As in most aspects of expenditure there are no arbitrary rules. The answer to your housing problem will depend partly on your individual needs, and your financial limitations. It will also depend on the place housing occupies in your scale of relative values, in other words, on your lifestyle.

If you do decide to buy, make sure that your decision is a thoughtful one and that the accommodation you get is what you want. Buying a home involves the single biggest cash outlay a family is likely to make. Surprisingly, housing authorities believe that many people are prone to making this awesome expenditure on impulse. It's one thing to buy a coat, or a piece of furniture on a whim, but the repercussions of buying a home in the same whimsical fashion can be serious.

Before you call your real estate agent with an offer to purchase, be sure you have followed these simple rules:

92
440

1 *Decide Where You Want to Live.* Think in terms of distance from work, schools, shopping, recreation facilities, community centres, libraries, etc. Make sure the location of your new home provides reasonable access to these and other necessary community facilities. Consider the neighbourhood itself carefully. Be satisfied that you'll be comfortable there. The physical surroundings should more or less reflect your own self-image of where you should be living at this stage of your life. If such considerations as ethnic or religious mix are important to you, be honest and acknowledge them now instead of regretting later that you didn't. Make sure there are children on the street among whom your own children can find friends.

2 *Decide How Much You Want to Spend.* Real estate brokers have long followed the rule of thumb, that the purchase price of a house should not exceed 2½ times your annual income. However, inflation, rising mortgage rates, and higher maintenance costs have tended to make such arbitrary standards unreliable. As with all your expenditures, no one is in a better position than you yourself, to carefully weigh your needs and desires against your ability to pay.

3 *Decide How Much House You Need.* Does each child need a separate room? How much space, and what kind of space will you need for entertaining? Will a guest room be necessary? A study? A sewing room? When considering your space needs, try and look ahead. Are you planning to have more children? Will you need a music room? Will some of your children be leaving home in the foreseeable future? Your space requirements will also depend on whether you will be settling into your new home permanently, or whether you are planning to buy another home at some future date.

4 *Decide Whether You Want an Old House or a New One.* Again, both have their own merits and limitations. Knowing which you want will save time when you finally go out looking. By choosing an older house, you can often get more house for your money. But older houses tend to need a lot of repairs and the price of household services has been rising sharply. Unless you are the home-handyman type, maintenance may cost you a lot.

5 *Consult Your Lawyer or Notary.* If you are like most people, buying a house is the most important financial transaction you are ever likely to make. Protect your investment by consulting your lawyer or notary. He will be able to assure you that the person selling you your house has the free and clear right to do so. He will also try and obtain for you the most advantageous mortgage terms, or help you find additional financing, if needed. At the very least, he will vet all your contracts for you, so that you can be sure you're not signing anything you shouldn't. It may pay to visit a banker in the neighborhood in which you are looking for a home. They often have useful, specialized knowledge of the real estate market in their own particular area. It also may pay you to have an architect look over your prospective new house, just to be absolutely certain it's in sound condition.

RENTING

Many of the considerations that apply to choosing your own home, apply equally to deciding upon rental accommodations. Whether you are buying or renting, you will want to live in a dwelling that's conveniently located in a congenial neighbourhood, with adequate space for your family's needs. You will also want to pay a price that you can reasonably afford.

Of course, the family looking to rent has some problems to solve that the homeowner doesn't. Is there convenient parking available? Are pets allowed? Is there a safe outdoor playing area for the children? If a house or duplex is being rented, is the landlord accessible in case of emergency repairs?

The crux of getting value for your money in rented accommodation is to be sure you sign a satisfactory lease. Remember, the terms of your lease are legally binding. Make sure you know exactly what you're signing.

Before you put your name on the dotted line:

1 *Try Bargaining.* Don't assume you have to accept the first terms the landlord offers. He may be more anxious to rent you the apartment than you are to have it. If there is a "buyer's" market he may be prepared to lower the rent, or make other concessions such as giving you the first month or two rent-free. At the very least, he may provide you with free paint to do your own decorating.

2 *Don't Accept Verbal Assurances.* Although it is a sad commentary on human failings, one has to assume, when renting, that oral agreements aren't worth the paper they're not written on. Make sure that all of your landlord's good intentions are written into the lease.

3 *Read Your Lease Carefully.* If you can't make enough sense out of it, give it to someone who can—your lawyer, or perhaps a knowledgeable friend. Many leases have tax-escalator clauses that allow the landlord to raise your rent anytime his property or water taxes are raised, even during your current lease. It may be possible to have the landlord strike this clause out of your lease. In many cases you won't be successful, but it will cost you nothing to try.

4 *Don't Assume the Landlord's Burdens.* Your lease should contain no clause making you liable for all repairs. Your liability for repairs should extend only to damages you cause.

5 *Be Sure You Can Sublet if Necessary.* At the time of signing, you may have every intention of remaining in your rented accommodation for the duration of your lease. But circumstances change. You may have to leave at short notice to take another job in a new city. Make sure your lease has a clause allowing you to sublet. Otherwise you could find yourself liable for the entire balance owing on the lease.

6 *Get a Signed Copy of the Lease Identical to the Landlord's Copy.* If a copy of the lease is not available when you are ready to sign, tell the landlord you will come back when it is ready.

7 *Don't Sign a Lease Which has Space Left Blank.* Make sure that all relevant dates, rental fees, etc., are clearly set down before signing. Don't accept any assurances that these "will be filled in later." They could be filled in, in a way you won't like.

8 *If You Leave a Deposit, Get a Receipt.* If you must secure the dwelling by giving a security deposit, in addition to the first month's rent, be sure to insist upon a receipt. When you are getting ready to move, apply this deposit against your last month's rent, instead of trying to get it back.

9 *Remember Your Renewal Date.* Most leases for rented accommodation are subject to automatic renewal unless you give the landlord the prescribed notice, usually three months, of your intention to vacate. Make sure you have your renewal date clearly in mind.

10 *Don't Sign a Lease on the Dotted Line.* Put your signature immediately below the last clause listed, leaving no room for anyone to add clauses after you have signed.

A Final Note About Renting

Municipal laws set minimal housing standards that landlords are expected to maintain. These laws cover such matters as fire safety, heating, sanitation and health. If you have any doubts about whether your present accommodation meets these standards, call your local city housing inspection department. They will also advise you as to the relative responsibility of you and your landlord for making necessary repairs.

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FINANCING YOUR NEW HOUSE — YOUR MORTGAGE

Let us follow the adventures of a fairly average Canadian family as they set about obtaining a mortgage.

The Browns, after years of apartment-living, have finally decided they want to buy a home. The next thing they must consider is the financing. How much should they pay for a house? How much should they put down in cash? Where can they get a mortgage—that is, a loan to pay for the house?

The first thing that the Browns should know is that there are several kinds of financial institutions in the business of lending money for residential purchases. These include banks, trust companies, life insurance companies, and the Central Mortgage and Housing Corporation, a government agency.

There are also three basic kinds of mortgages available in Canada:

1 National Housing Act Mortgages.

These mortgages are available either from CMHC, trust companies, life insurance companies, or banks. The property value and the maximum amount of the mortgage are set by the CMHC. National Housing Act mortgages are available for new or existing homes. The time allowed for repayment of the loan can be up to 25 years. The amount of the mortgage can be as high as 95 percent of the property value. However, at the time of writing, the maximum loan obtainable under the National Housing Act is $25,000, regardless of the value of the property. The monthly mortgage payments, including repayment of principal, interest, and real estate taxes, may not exceed 27 percent of the applicant's income. If the applicant is the husband, and the wife is working, part of her income may be included in the calculation of total income.

2 Conventional Mortgages.

These mortgages are offered by banks, trust companies, and life insurance companies. Normally the repayment period for conventional mortgages is up to 25 years. This type of mortgage is available for both new and existing homes, and it is common practice to lend up to 75% of the property value. The maximum dollar limit on a conventional mortgage is now $40,000 as compared to the limit of $25,000 offered by the NHA, so substantially more money can be had for higher priced homes. But a higher cash payment must be made, since traditionally only 75 percent of the home can be financed. With a conventional mortgage, the monthly mortgage payments including interest, taxes and repayment of principal, customarily shouldn't exceed one quarter of the applicant's income.

3 Combined Mortgages.

Banks, trust companies and life insurance companies also offer combined mortgages. With these, up to 90 percent of the property value on new or existing homes can be obtained. The repayment period is up to 25 years. The maximum dollar limit on this type of mortgage is about $50,000.

Sources and Types of Mortgage Loans

	NHA Insured	Conventional	Combined
Banks	☐	☐	☐
Trust Companies	☐	☐	☐
Life Insurance Companies	☐	☐	☐
Central Mortgage and Housing Corporation	☐	–	–

The Browns have an income of $10,000 a year. They have $4,000 in a savings account, specifically earmarked for home purchase. When they look over their money-management plan, they decide they should be looking for a home in the $20,000 to $25,000 price range.

They find a house that suits their taste, and their needs. The asking price for the house is $24,500. The Browns' real estate agent suggests that they offer about 10 percent less, that is $22,000. The owner of the house responds by saying that he will reduce his asking price to $23,500 and not a cent less. The Browns want the house, and on their agent's advice, decide to make a formal offer to buy it at $22,500.

Making An Offer

The Browns have reached a crucial step in their quest for a new home. They would be wise to consult a lawyer before signing a formal offer. It's important for them to know what they are committing themselves to, by making such an offer.

Any formal offer they sign should state that they are offering to buy the house at a stated price, *on condition* that they can get the financing that they want. Without this clause being included, they may find themselves committed to buying the house, with less cash than they have, and with a mortgage they cannot comfortably afford.

The Browns will have to attach a "deposit" cheque to their offer. Generally the amount of the cheque will be at least 5 percent of the selling price of the house. They will be well advised to put an *escrow* clause in their offer, which compels the receiver of their deposit to hold it in trust until the deed of sale is finally signed. With the escrow clause the Browns won't have to worry about getting their deposit back should they have to. Otherwise, the receiving party could cash their cheque immediately.

Financing the Terms of Sale

Now the Browns are ready to finance the terms of sale. Here are the possibilities open to them:

	Mortgage Amount (1972)		
Value of the House	NHA	Conventional	Combined
$22,500	$21,000	$16,875	$20,250
Cash required	2,000	5,625	2,250

The Browns opt for a combined mortgage. They know that they will need an additional sum of money, perhaps $1,000, for other costs involved in buying a house. These costs include fire and casualty insurance required by the lender of the mortgage money, plus "adjustment" costs.

The Browns' homework is not finished yet. They want to know how much interest they will have to pay, and how long they can take to pay off the loan.

Since there is considerable variation in interest rates and duration of mortgages, the Browns are also interested in knowing how much extra they would spend depending on interest rates and mortgage maturity.

Total Interest Outlay and Monthly Payment for Principal and Interest on a $20,000 Loan

	20 Years		25 Years	
Interest Rate	Total Interest	Monthly Payment	Total Interest	Monthly Payment
7½%	$18,500	$160	$23,800	$146
8 %	19,840	166	25,900	153
8½%	21,520	173	27,700	159
8¾%	22,000	175	28,600	162
9 %	22,720	178	29,800	166
9¼%	23,440	181	30,700	169
9½%	24,160	184	31,600	172

What the Browns discovered is that even at the lowest interest rate available, the total cost of their new home, including interest on the mortgage loan, amounted to almost $45,000. This was double the selling price of the house.

They also realized that they could save more than $6,000 by taking a 20-year rather than a 25-year mortgage. However, this also adds about $15 a month to their mortgage payments.

What the Browns Chose

The Browns finally decided on a combined mortgage of $20,250, over 25 years at an interest rate of 8¾%.

In their case, it was the best deal they could afford. With an income of $10,000, their combined mortgage plus real estate taxes could not legally exceed $208. At 8¾%, a 25 year mortgage would cost them $165 a month. Assuming taxes of $40 a month, ($480 a year), their monthly payments come to $205.

However, what the Browns chose in financing the purchase of their home is not really important to you. What is important is that the Browns did their homework and made their own choice on the basis of the facts. Hopefully when you are considering a home purchase, you will do the same.

Financing Your Own Home Purchase

Remember that there are some advantages to making the lowest down-payment possible, and borrowing for the longest repayment period available:

First, such an arrangement means that your monthly payments will be low. This can make money management easier.

Second, inflation cuts the true cost of the mortgage. The purchasing power of the dollar has been dropping for many years now. The dollar that was worth 100 cents in 1961 is worth only 74 cents today. Anyone who has held a mortgage over the past twenty years has been repaying his debt with money that has been getting cheaper. Along with the rising costs of living, wages and salaries have been going up steadily. Since monthly mortgage payments are fixed for at least five years, they have become a relatively smaller proportion of a family's expenditure.

Third, the interest rate you are quoted for your mortgage is a true interest rate. Suppose you can borrow mortgage money at 9 percent. This is a lower rate than you will now have to pay for any installment loan, or installment credit purchase. The cheapest installment loans will now cost you 12 percent a year, installment credit more than that. Therefore, it might be advantageous to keep your savings to pay cash for "big-ticket" items like cars or washing machines.

Finally, a house with low monthly payments and a large mortgage, may be more attractive to a potential buyer when the time comes to offer your house for sale. For the buyer it means that you will want a lower down-payment, and the buyer may be able to take over the existing mortgage.

Assuming the Present Mortgage

If you are thinking of buying a house that is not brand new, the chances are that there is already a mortgage on it. If it is a mortgage you can keep, you will save substantial sums of money.

First, the interest rate on an existing mortgage is probably lower than present rates. Second, you can save money in "adjustment" costs.

Adjustment Costs

There are expenses involved in buying a house, apart from the selling price of the house. If the new home-buyer is not aware of these expenses they can come as an unpleasant surprise. Some of the possible adjustment costs are:

Title Search—collecting and examining documents relating to the prior ownership of the property, to ensure that there are no liens, or claims on the property, and that the present owner holds the title free and clear.

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Real Estate Taxes—if the seller has paid taxes beyond the date of closing, you will have to repay him, as of the time you take over the property.

Appraisal Fees—the mortgage lender will usually require an independent appraiser's report on the value of the home. You will be billed for the cost of the report.

Fuel—you will have to pay for whatever fuel oil is left over in the fuel tank at the time of closing.

Legal fees—you may be charged not only your own lawyer's fee, but the seller's lawyer's fee as well. Your lawyer can negotiate to have this fee excluded.

INSURING YOUR HOME

Whether you own your own home, or are renting living accommodation you will want to consider insuring yourself against the following contingencies:

1. Loss of, or damage to, all your household contents, and/or your personal belongings, from a variety of causes.

2. Injuries incurred by others in your home, or caused by a member or members of your family.

3. Damage to the property of others, caused by you, or by a member or members of your family.

If you are a homeowner you will, in addition, have to consider taking out insurance on your house itself. If there is a mortgage on the house you are buying, the holder of the mortgage will insist on such insurance.

How Much Insurance Do You Need?

The amount of insurance you buy depends on how much you can afford to lose. Most commonly people buy enough coverage to enable them to recover the current value of the items lost through fire, theft, or whatever else they are insured against. In considering your insurance needs from year to year, try to make allowances for both depreciation and appreciation. Household items like furniture tend to depreciate.

On the other hand, some items like paintings or antiques tend to become more valuable. They should be insured for their current value.

Similarly, keep abreast of developments in the real estate market. Your house should be insured for an amount that will enable you to replace it, in case of total loss.

What Kind of Insurance Do You Need?

Insurance for your home and its contents is increasingly being offered in "homeowner's package" form. These insurance "packages" are multi-purpose policies that will protect you against the dozen or so most common types of peril, such as fire, theft, windstorm, vandalism, etc.

"Package" policies come under a variety of names.

The variety is so diverse, and even bewildering, that it will pay you to invest time and effort in research, to make sure you understand exactly what each covers.

For Your Added Insurance

Your insurance company will not insist upon it, but for your own benefit, it is a good idea to have an itemized list of your possessions in case you have to file a claim. It may seem like an intimidating amount of work to list all your furnishings, linen, appliances, clothing and personal effects. However, try to imagine what would happen if your home were burgled, or destroyed by fire. In the latter case especially, the job of remembering everything you once owned would be immense.

Remember that when you have to make a claim, the burden of proof that an item existed, rests with you. It's almost too obvious to mention, but please don't keep your itemized list in the house. Give it to a friend, or put it in a safe deposit box.

If you have special items of great value, "objets d'art," heirlooms, or antiques for example, you may want to have them itemized separately in the policy itself. But this will, of course, involve an extra premium and a higher cost.

Value For Your Household Insurance

Keep your policies current. In any given year you will both acquire and discard possessions. Your possessions will both depreciate and appreciate in value. The cost of replacing your present house may rise substantially. These changes should be reflected in the coverage you ask for.

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TO SUM UP

No matter what you are shopping for—a car, a pair of shoes, a sofa, or even insurance—you're going to end up parting with some of your hard earned cash.

If, after all is said and done you decide you want something now, out of season for whatever reason, fine. You may be paying a premium for that "something you must have". You may decide that your enjoyment is well worth the additional expense. Only you can make the choice. Only you can decide what constitutes value for *your* money.

Mathematics Item Progress Check

UNIT VI: CONSUMER MATH Name: _____

ITEM D : OPERATING A HOME Date: _____

Form 1

Criterion:	9 / 11
Score:	___/___

Problems: In the space below, show the work you do to solve problems. One mark is for your work, and one mark is for the correct answer.

1. In buying a house you take out a mortgage for $12,000 at an interest rate of 7% per annum and agree to pay a monthly payment of $90.00.

(2) a) How much of the payment is interest for the first month?

_____

(2) b) How much of the first payment goes towards reducing the principle?

_____

(2) 2. Determine the yearly cost of running a house if you have the following monthly expenses.

Telephone	$7.00
Electricity	15.00
Heat	25.00
Mortgage	120.00
Insurance	8.00
Taxes	30.00
Repairs	20.00
Furniture	16.00

_____

(5) Circle the best answer for each of the following.

1. Monthly mortgage payments, including repayment of principle, interest, and real estate taxes should not exceed what percent of the future home owners income.

   a. 10%
   b. 25%
   c. 35%
   d. 50%

2. NHA mortages may not be obtained from-

   a. banks
   b. CMHC
   c. finance companies
   d. trust companies

3. When making a formal offer to purchase a home and when a "deposit" cheque has to be included with the offer, it is wise to -

   a. put an escrow clause in the offer
   b. obtain a title deed for the house
   c. know the interest rate on the mortgage
   d. put a sublet clause in the offer

4. The amount of a mortgage can be as high as what percent of the property value for property valued at $25,000 ?

   a. 100%
   b. 95%
   c. 85%
   d. 75%

5. What is not included in monthly mortgage repayments?

   a. property taxes
   b. principle
   c. fire insurance
   d. interest

Mathematics Item Progress Check

UNIT VI: CONSUMER MATH Name: _____

ITEM D : OPERATING A HOME Date: _____

Form 2

Criterion:	7 / 9
Score:	___/___

Problems: In the space below, show the work you do to solve problems. One mark is for your work, and one mark is for the correct answer.

(2) 1. What would the total cost be for a $25,000 house if you put a down payment of $5,000 and had mortgage payments of $165.00 per month for 25 years.

(2) 2. Determine the yearly cost of renting an apartment given the following monthly costs:

Rent	$120.00
Insurance	8.00
Electricity	12.00
Phone	7.00

(5)

Circle the best answer for each of the following.

1. Monthly mortgage payments, including repayment of principle, interest, and real estate taxes should not exceed what percent of the future home owners income.

   a. 10%
   b. 25%
   c. 35%
   d. 50%

2. NHA mortages may not be obtained from-

   a. banks
   b. CMHC
   c. finance companies
   d. trust companies

3. When making a formal offer to purchase a home and when a "deposit" cheque has to be included with the offer, it is wise to -

   a. put an escrow clause in the offer
   b. obtain a title deed for the house
   c. know the interest rate on the mortgage
   d. put a sublet clause in the offer

4. The amount of a mortgage can be as high as what percent of the property value for property valued at $25,000 ?

   a. 100%
   b. 95%
   c. 85%
   d. 75%

5. What is not included in monthly mortgage repayments?

   a. property taxes
   b. principle
   c. fire insurance
   d. interest

MATHEMATICS

UNIT VI: CONSUMER MATH

ITEM E : OPERATING A CAR

Do the work listed below for each objective and check off each step as you complete it.

OBJECTIVES

The student must be able to:

1. Determine the cost of buying a car, given information such as:

   a. advertised price of the car
   b. value of trade-in, if any
   c. sales tax
   d. down payment
   e. finance charges

2. Calculate weekly, monthly and yearly operating costs of an automobile considering depreciation, fuel and lubrication, repairs, insurance, licence and finance costs.

LEARNING RESOURCES

Books: B Math, Pitman
Refresher Mathematics, Stein

Booklets: Operating a Car, information sheet
Booklets on Auto Plan

LEARNING ACTIVITIES

Start by reading the booklet on "Operating a Car". Then read pages 113-115 in B-Math and do exercise 5-8 question 1(a) and 3(a) on page 115 and question 4 (top of page 116). Then read about auto insurance on pages 224-228. Do exercise 9-7 starting at the bottom of page 228 and top of page 229 question a-d.

If all your work is correct to this stage, you are ready to write, Item Progress Check VI E, Form 1. If you make the criterion, you are ready to go on to Unit VI, Item F.

If you do not make the criterion on the Item Progress Check, or if you have had difficulty with the above questions, get a copy of Refresher Mathematics and try some of the odd numbered problems on page 554.

Now check with your instructor and do Item Progress Check VI E, Form 2. If you meet the criterion, go on to Unit VI, Item F. If you do not, discuss your difficulties with your instructor.

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GETTING THERE IS HALF THE EXPENSE

Not only has Canada been long a nation of homeowners, it has, since the turn of the century, been a nation of car-owners. There were more cars sold in Canada last year than there were radios, record players, washing machines, dryers, refrigerators, or even television sets.

The purchase of a car represents one of the largest single expenditures a family, or an individual will make. Despite this, few of the thousands of people who will buy a car this year will be getting the best value for their money.

Whenever you go to shop for your new car, you will be faced with a choice among approximately 300 domestic and foreign-made models, each with a wide range of optional equipment. At best it won't be easy to decide on the make and model most suitable for your own needs. But you can increase your chances of getting good value for the money you ultimately spend, if you do some homework in advance.

1 *When to Buy Your Car.* According to the experts, the best time to shop for a car is anytime car sales are slow. During such slow periods, dealers are much more likely to offer concessions and bargains and little extras, just to create some action for themselves. December seems to be a particularly good month, especially before or after Christmas, because few people are thinking about buying a car at this time. Mid-winter generally is a good time, and the more severe and trying the weather, the better. Few people think about buying a new car at a time when the very idea of driving is unpleasant and bothersome. Conversely, one of the worst times to buy is in the spring when the weather clears and drivers are able to indulge their long-suppressed itch to hit the road again.

Late summer can be an advantageous time for you to make your car purchase, but only if you plan to keep your car for the long haul. Most makes automatically depreciate 25 or 30 percent immediately the new models come out in the fall. This means that if you plan to trade in two years or so, you will lose as much in depreciation as you have saved by buying at the end of summer.

2 *When to Trade In Your Car.* If you have a car now, it's not too difficult to figure out when you should consider trading it in. Essentially, the rule is get rid of your faithful family chariot when the yearly cost of maintenance begins to overtake the annual depreciation. Your car will suffer its greatest depreciation in the first few years of your ownership. Then the rate of depreciation will decline from year to year. Meanwhile, however, after the first year, your maintenance costs will begin creeping upward, rising to a peak in four or five years. The experts will tell you that the best time to trade in your car, on the average, is when it is between four and five years old. Remember however, that this is only an average. With luck you may have low repair bills for a long while after that. From a strictly economic standpoint there is no reason to trade in a car five years old, or older, if the maintenance costs have remained low. By this time your car is depreciating very little, and is costing you little more to run than the cost of maintaining it. You are almost getting a free ride.

3 *Why You Want a Car.* A car means something different to each individual. To some people it's a status symbol, or even a sex symbol. To others it's merely a means of getting from one place to another as quickly and economically as possible. If what you want is cheap transportation, bear in mind that both the initial layout, and the upkeep for a luxury model, are about double what a small car will cost. If you do opt for a small car remember that some models depreciate much faster than others. American-made small cars tend to depreciate faster than foreign makes. It is a major selling point for some foreign cars, that they depreciate very slowly from year to year.

4 *What Optional Equipment You Absolutely Need.* Decide in advance what optional equipment you are going to buy. By refusing all the accessories, you can cut the cost of your car by as much as 30 percent. Bear in mind for example that an installed car radio costs $60-$75, while a transistor radio can be bought for far less. An automatic transmission not only may add substantially to the cost of your car, but it is also less efficient in delivering power to the wheels. This means higher fuel bills and maintenance costs. On the other hand, you may feel that it makes driving easier, and is worth the added expense.

5 *What You Can Expect to Pay.* The one price you do not have to pay is the suggested price. This price is offered merely as an opening gambit. Dealers expect to bargain.

Generally speaking, the dealer paid between 15 and 25 percent less than the price tag says for any car he shows you. Remember though, that the dealer has overhead expenses and must make some profit to stay in business. So add between $100-$200 to his costs in order to get an idea of the smallest amount you will have to pay.

6 *Make Up Your Mind Not to be Pressured.* Car dealers, and particularly used-car dealers are not noted for their soft-sell. The average car buyer, on the verge of committing himself to this major purchase, his head spinning with figures, prices, payment-schedules, performance ratings, is very susceptible to high pressure salesmanship. Make up your mind in advance to resist it. If necessary, resort to the device of shopping alone. This will enable you, when you are pressed, to ease yourself out of the hot spot by saying that you must consult your wife/husband or friend.

These are a few of the techniques that will enable you to get good value for your car dollar. In addition there are numerous publications, like Consumer Reports and Consumer Digest that will provide you with detailed information about any specific car you have in mind.

Financing Your Car Purchase

As with anything else you buy, paying cash is the cheapest way to pay for your car. But not everyone has $2,000, $3,000, or $4,000 to lay out for a car.

Basically, there are only two ways in which you can finance your car purchase—either with a loan you guarantee by putting up some form of security, or with an unsecured loan you repay in regular instalments.

There are several kinds of financial institutions that will help you arrange the financing of your purchase. For a detailed discussion of these, see Booklet 2 of this series, *Put Time on Your Side*. One important lesson of that particular booklet is that you should shop for money just as carefully as you would shop for your car.

Other "Big Ticket" Items

The basic principles of researching and financing the purchase of cars and homes apply equally to the purchase of other "big-ticket" items like TV sets, refrigerators, washing machines, dryers, and furniture.

Consumer publications, like the Canadian Consumer, Consumer Reports, and Consumer Digest, provide details about virtually every consumer item available—physical details as well as performance ratings and suggested retail prices.

As with all other consumer items, finance charges vary. Cash purchases involve no additional expense. Credit purchases can cost a lot or a little, depending on where you borrow, how much you borrow, and how long you take to repay the loan. For more details on credit, see Booklet 2 of this series, *Put Time on Your Side*.

"LET A SMILE BE YOUR UMBRELLA" — AND YOU'RE IN TROUBLE

This booklet is aimed at helping you get the best value possible when shopping for "big-ticket" items. Once you have purchased either a car or a home, it is important to consider insuring yourself against loss or damage. This section examines insurance protection for your possessions. Booklet 5, *Your Stake in Tomorrow*, discusses various aspects of *life* insurance, that is, insurance as an investment.

The sole reason for insuring your possession is protection—protection against the risk of loss, or against the possibility that you might injure someone else, or damage his property.

All insurance premiums are based on likelihood, or the chance of something happening. For example, no one can predict with certainty that your house will burn down tomorrow. But on the basis of past experience with houses like yours, probability theory can accurately determine how big the chances are of it happening.

Some people consider insuring possessions is akin to laying a bet. Considering the size of the average outlay one makes to insure against loss or injury to others, and the large amounts of money that are involved should the worst happen, it appears that the biggest gamblers are those who do not buy insurance.

Insuring Your Car

No intelligent person would think of owning and driving a car without a certain amount of insurance coverage. Such coverage is necessary because no one can afford to pay the judgments that can result from an accident that kills or injures other people.

Liability Insurance

Of the four basic types of insurance coverage you can take out on your car, liability insurance must be given the highest priority. Auto liability insurance will protect you as owner of an automobile if you are faced with a claim from one or more persons, involving either injury to them or to their property, arising from a car accident in which you were involved. This is called "third party" liability insurance. The other two parties are you and the insurance company.

The tragedy of a major car accident is compounded if drivers do not have liability insurance coverage. The victims, or their families, are not reasonably compensated, and face economic hardship in addition to their tragic personal loss. The person judged responsible, unless he is insured, can literally be reduced to a state of bondage, in paying off the judgment.

Liability insurance covers you in the event that your car injures others or damages their property, regardless of who is driving, as long as the car is being driven by a licenced driver with your knowledge and permission. This is important, because liability rests with the owner of the car and not with the driver. Your liability insurance does not cover damage to your own car or person, or your children or spouse. Its only possible payout is to a wronged third party who can prove you were at fault.

If you are drunk when you are involved in an accident, you may lose the benefits of your insurance coverage. In such circumstances, your insurance company will probably pay only the minimum required by law. They can then sue you, to get even that back.

Today's traffic conditions are dangerous. Today's cars are notoriously fragile. Today's legal judgments tend to be high. All this should be borne in mind when you consider liability insurance. Many experts believe every driver should carry at least $200,000 liability insurance for injury to one or more persons. The more liability insurance you buy, the cheaper it gets. While $200,000 will cost you something over $100 a year; $300,000 will be only about $10 a year more.

Medical Payments Insurance and Accident Benefits

Medical payments coverage has long been standard, although optional in most auto policies. This insurance covers any passengers in your car, regardless of fault, and pays medical expenses not covered by private and government insurance. Standard coverage of $2,000 will cost you about $2 a year.

Collision Insurance

Collision insurance covers damage to your own car, in case of accident. You can buy collision insurance with a "deductible" of any amount from $50 upward. This means that you pay for the first $50 of repairs, and your company pays for the rest. The higher the "deductible," the lower the cost of the policy. The most popular deductibles today (1972) are $100 and $250.

As your car gets older, you might want to consider increasing the amount of the "deductible". Eventually it may not pay you to carry collision insurance at all. Your insurance company is not likely to pay a repair bill that is greater than the current market value of the car itself.

Comprehensive Coverage

You may also insure your car against "comprehensive perils". Such insurance ostensibly covers you against everything except collision. This coverage will cost under $50 a year usually with a $25 deductible.

Read the wording of these policies carefully to make sure you know exactly what you are being protected from.

All cars registered in B. C. must carry car insurance. All drivers who hold a B. C. driver's license must carry driver's insurance. Both forms of insurance are only available through the B. C. government's "Insurance Corporation of B. C.". Pamphlets giving information are available from their address which is:

Insurance Corporation of B. C.,
P. O. Box 11131, Royal Centre,
1055 West Georgia Street,
Vancouver B. C.,
V6E 3R4

For additional information call 665-2800.
Outside Vancouver, call collect.

Mathematics Item Progress Check

UNIT VI: CONSUMER MATH Name: _____

ITEM E : OPERATING A CAR Date: _____

Form 1

Criterion:	9 /11
Score:	___/___

Problems: In the space below, show the work you do to solve problems. One mark is for your work, and one mark is for the correct answer.

(2) 1. Calculate the cost per mile to operate an automobile given the following information:

miles driven	12,000 miles
estimated depreciation	$600.00
gasoline and oil	$750.00
repairs	$240.00
licence & insurance	$210.00

Cost per mile _____

2. Henry bought a car for $2,400. He gave the dealer $60.00 as a down payment, and will pay the rest of the money at the rate of $60. per month for 48 months.

(2) a) what is the total price paid for the car after four years?

(2) b) what amount of money was paid out in interest?

(5)

3. Circle the best answer for each of the following.

1. When is the worst time to buy a car if you want a good deal?

a. Christmas
b. Spring
c. Summer
d. Fall

2. A new car will suffer its greatest depreciation.-

a. in its first year
b. in its fourth year
c. in its seventh year
d. each year, since each year is the same

3. To avoid high pressure used-car dealers you may.-

a. take a friend along
b. shop alone
c. pay cash
d. tell him you have a trade-in

4. Which of the following is not a form of car insurance -

a. comprehensive coverage
b. collision insurance
c. depreciation insurance
d. medical payments insurance and accident benefits

5. Comprehensive insurance covers -

a. collision
b. fire
c. upset
d. third party liability

Mathematics Item Progress Check

UNIT VI: CONSUMER MATH Name: _____

ITEM E: OPERATING A CAR Date: _____

Form 2

Criterion:	9 /11
Score:	___/___

Problems: In the space below, show the work you do to solve problems. One mark is for you work, and one mark is for the correct answer.

(2) 1. If you buy a car for $4,000 and keep it for 3 years, it is estimated to be worth $2,400 at the end of that time. During the period, you pay for the car on installments including finance charges of $400. If you drive the car 30,000 miles during this period, calculate the cost per mile for depreciation and finance charges to the nearest cent.

(2) 2. Calculate the cost per mile to operate a car using the following information.

miles driven	1,500
depreciation	$100.00
gasoline	$37.50
oil & repairs	$4.25
licence & insurance	$8.25

(2) 3. Calculate the cost of purchasing a car on time considering the following.

selling price	$495.00
sales tax	24.75
finance charges	40.05
licence	20.00
insurance	185.00

(5) 4. Circle the best answer for each of the following.

1. When is the worst time to buy a car if you want a good deal?

   a. Christmas
   b. Spring
   c. Summer
   d. Fall

2. A new car will suffer its greatest depreciation.-

   a. in its first year
   b. in its fourth year
   c. in its seventh year
   d. each year, since each year is the same

3. To avoid high pressure used-car dealers you may.-

   a. take a friend along
   b. shop alone
   c. pay cash
   d. tell him you have a trade-in

4. Which of the following is not a form of car insurance -

   a. comprehensive coverage
   b. collision insurance
   c. depreciation insurance
   d. medical payments insurance and accident benefits

5. Comprehensive insurance covers -

   a. collision
   b. fire
   c. upset
   d. third party liability

MATHEMATICS

UNIT VI: CONSUMER MATH

ITEM F : BUDGETING AND COMPARISON SHOPPING

Do the work listed below for each objective and check off each step as you complete it.

OBJECTIVES

The student must be able to:

1. Set up a budget and solve income and expenditure problems involving salary, taxes, food, clothing, housing, utilities, transportation, savings and entertainment.

2. Determine the best buy from comparing two or more similar objects considering such things as cost, quality, size, type of material.

LEARNING RESOURCES

Books: Refresher Mathematics, Stein
General Mathematics, Ginn and Company

Booklets: Your Money Matters, Royal Bank of Canada
Budgeting and Comparison Shopping, Information Sheet

Filmstrips with cassette tapes:

The Budget - Today and Tomorrow, Eyegate
How to Shop, Eyegate

LEARNING ACTIVITIES

Start by reading pages 10-25 in the booklet "Your Money Matters" and also the booklet on "Budgeting and Comparison Shopping". Then turn to page 544 in Refresher Math, read about "Spending Money" and do exercise 1 a-k.

On page 545 do exercise 3 a-g. On page 546 do problem 5 a and b. Then read about "Buying at a Sale" on page 546 and 547 and do exercise 1 and 3. Now read "Determining the Better Buy" on page 548 and on page 549 do exercises 1 a-f, 3,5 and 7 a and b. On page 550 do question 9 a-g. Then get a copy of General Mathematics and read pages 402 to 405. Do questions 4 and 5. Check your answers with those in the back of the book.

Some practical work on comparison shopping appears in your Science course. Finally get together with any other students who are on Item F and watch the films "The Budget - Today and Tomorrow" and "How to Shop". These are filmstrips which have cassette tapes to go along with them. Use the DuKane projector. See the questions at the end of the filmstrips, look over the Objectives, and discuss how you would meet these Objectives.

If all your work is correct to this stage, you are ready to write Item Progress Check VI F, Form 1. If you make the criterion you are ready to go on to Unit VI Item G.

If you do not make the criterion on the Item Progress Check, or if you have had difficulty with the above questions, go over the above Learning Activities again with another student or your instructor.

Now check with your instructor and do Item Progress Check VI F, Form 2. If you meet the criterion, you go on to Unit VI Item G.
If you do not, discuss your difficulties with your instructor.

REPRINTED FROM - YOUR MONEY MATTERS - THE ROYAL BANK OF CANADA

A FORTUNE TO SPEND

What would be your reaction if you were to learn that half a million dollars were to be placed at your disposal? Initially, probably you would experience profound shock and disbelief at the very idea of your coming into possession of such a vast sum. However, once convinced that this fortune was indeed yours, it would be natural if you indulged yourself a bit, at first. You might very well splurge on a new home, or a luxurious car, or an exotic vacation, or a fashionable wardrobe.

However, having had your fling, the chances are that you would want to make sure that the great bulk of your acquisition was soundly invested and carefully spent. After all, half a million dollars is a serious amount of money, not to be lightly regarded.

You may consider it mere idle speculation to wonder what you would do with five hundred thousand dollars, since you are unlikely to have this "problem" in your lifetime.

Wrong!

This is precisely the problem you will have to deal with in your lifetime. If you are an average Canadian, whether you start working immediately after high school graduation, or wait until you have finished college, by the time you reach retirement, you will have earned close to half a million dollars.

Obviously there is a difference between receiving such a huge amount of money in one lump sum, and earning it painstakingly over your entire lifetime. But whether it comes to you the hard or the easy way, it is a sum of money not to be taken lightly. You will presumably want to spend it, or to invest it, or to save it, in ways that will bring you the greatest benefits and the deepest satisfaction.

One way to ensure this happening is through a program of intelligent money management.

Do you really need a money-management program?

To help you decide, ask yourself these questions

- Are you able to live easily within your means?
- Are you spending your money on the things you really want and need?
- Are you getting full value for the money you spend?
- Are you allowing for inflation and higher taxation in your expenditures?
- Are you able to save money on a regular basis?
- Are your savings steadily increasing from year to year?
- Are you able to pay your bills?
- Are you able to meet installment payments?
- Are you able to meet loan payments?
- Are your debts increasing or decreasing?
- Are you financially prepared to cope with emergency expenditures?
- Are you working towards specific financial goals?
- Are you likely to achieve them?
- Are your children assured of a good education?
- Are you providing for your family's security in case of death, disability?
- Are you systematically preparing for a comfortable retirement?

If you're not sure of the answers, or if you aren't happy about the answers you come up with, now may be as good a time as any to do something about it.

BOOSTING YOUR INCOME

If you have been planning your spending as carefully and conscientiously as you know how, and still finding yourself in the grip of insurmountable financial difficulties, you may finally have to acknowledge that there is no way your present income can meet your needs.

Many Canadian families have come to this conclusion, and as a result they have resorted to a variety of solutions to supplement their incomes.

The Two-Salary Family

If the family is finding it hard to make ends meet on a single salary, perhaps the answer is to become a two-salary family. In recent years, more and more wives have been going to work to bolster the family budget. Statistics Canada reports that in 1970, over 50 percent of the total female labour force were working wives. Presumably, while some married women work because they absolutely have to, many others do so voluntarily, in order to provide some of the extras of living.

However, don't count on this second salary to put your family immediately on easy street. When a married woman goes to work, there are additional expenses involved, as well as additional income.

Take the case of a young mother who goes back to her secretarial job in order to help out with the family finances. At first sight, the $5,000 plus a year she will be making looks like an enormous contribution to the family budget. But is it?

To begin with her $110 weekly salary will probably shrink to about $82 or so, by the time her payroll deductions have been made. Then too, by taking on the job, she immediately incurs new expenses. She will have to pay for transportation to and from the office. She will spend a certain amount on lunches and coffee breaks. Her food shopping will tend to be less economical than when she was at home. She will have little time for comparative shopping, and will tend to buy more of the expensive convenience foods that she can cook quickly when she comes home from work. Finally, she will need to pay for an

The net result after all this, is that she will probably be bringing home no more than $30 to $35 a week.

In addition, the fact of her working will alter the family's income tax situation, probably not to their advantage. Her husband will lose part of his dependents' exemption. Against that, they will be able to claim a certain amount for the baby-sitter's salary.

In any event, her contribution to the family exchequer will be closer to $1,500 a year, than the $5,000 she expected to make, in the first flush of enthusiasm about going back to work.

Her income will still undoubtedly be a great help, but it may not provide the complete solution to the family's financial problems. Only in those cases where the wife can earn a very large salary, will her taking on a full-time job provide a clear-cut financial advantage.

Other Alternatives

The housewive we have just described returned to full-time office work, because this was the job she knew best, and the job she was most likely to find. However, there are other ways in which she could deal with the problem of earning additional income.

A part-time job might well be the answer. While it would not pay as much, neither would it cost her $50 a week or more to maintain. She will spend far less on baby-sitting. As well, with more time available to her, she will probably be able to shop, and run her household more economically.

Or, perhaps she might find something she can do at home to earn money. She might be able to knit, or do some dressmaking, or offer typing services. Perhaps she could mind another child with her own, and get paid for baby-sitting, rather than herself doing the paying.

On the other hand perhaps there are ways for her husband to boost his own income.

Moonlighting

There are no detailed records of how many people in Canada hold down two jobs. But there are many reasons to believe that a sizeable number of people do so. This does not necessarily mean that they were maintaining two full-time jobs. In most cases they did some extra but regular work, in addition to their normal full-time job.

Some men "moonlight" simply to supplement their regular incomes; a good example of this would be the office worker who puts in a couple of hours every evening as a gas jockey in the neighbourhood service station.

Other men use their spare time to not only make a little extra, but to advance their careers. A young accountant for example, might look after the books of a few small businesses in his neighbourhood, or perhaps serve as a free-lance income-tax consultant. He does this partly to pay for the European trip he and his wife are planning, and partly to broaden his business experience.

Some people manage to combine business with pleasure. An example might be the school teacher who is also a ski-buff. Combining his two talents, he runs a small but profitable week-end ski-school.

Almost everyone has an exploitable skill. If you were to make a list of all the things you both enjoy doing and do well, you'd probably be surprised at the extent of your talents.

Some of them can probably be turned to financial advantage

PLANNING MAKES MORE THINGS POSSIBLE

Don't be lulled into thinking that a system of planned spending will make the difference between being rich and being poor. It won't and it can't. Only a larger income can do that.

But planned spending may well make the difference between feeling poor and feeling rich. Because, through planning, you can avoid that miserable business of always living beyond your means—on next week's or next month's pay; of living just one step away from disaster.

Even the best-planned plan, of course, is no guarantee that things will work out exactly the way you want them. Or that you will get all you want out of life. But, if you know where you want to go and you have worked out a way to get there, your chances of making it are that much greater.

The Importance of Consumer Behaviour

Did you know that there is a vast army of men and women who spend most of their waking hours thinking of little else but you? While you go about your daily life, blissfully unaware, these people are busily experimenting with you, studying you, analyzing you. They want desperately to know your tastes, your preferences and your eccentricities. They won't rest until they have fathomed your innermost thoughts, divined your secret desires, and ferreted out your private ambitions.

Despite their seemingly strange obsession with your person, they are not, as you might by now suspect, an organization of escaped madmen. These people who are so totally preoccupied with you, are in fact among the most hard-headed members of our society—those who have goods and services to sell.

But what do they want with you? You are quite an ordinary person. What possible advantage can they gain by investing all this time and energy in finding out about you?

The fact is that you are not ordinary at all. You are the single most important cog in the machinery of our industrial society. Our entire socio-economic system revolves around you. You are all-powerful. The fate of vast industrial empires hangs upon your simple "yes" or "no". You are the consumer!

Do you still find it hard to believe in your own importance? Then consider that more than 75 percent of the national income is spent by consumers on goods and services. Therefore the manner in which you express your tastes and preferences as a consumer has a direct bearing on our standard of living as a people.

A67

A manufacturer releases a new product. Do you like it? Will you buy it? Will you continue to buy it? The success or failure of the product, the well-being of the company and the people who have conceived, manufactured and distributed it, all directly depend on your reaction.

It should not be surprising then, that so much effort is expended in studying consumer behaviour in order to ensure as far as possible that your reaction will be a favourable one. Nor is it surprising that a comparable amount of effort is invested in attempting to favourably influence your reaction.

Getting Value For Your Money

It is the business of those who provide goods and services to sell you things. That is how they make their money. Some of the things they try to sell you may be things you want and need. Some may not. You can't blame them for trying.

One thing is certain. You can't avoid spending money. In fact, most of the money you make will be spent, one way or another. A surprising amount of your time as well, will be spent in spending money. Most of this time and money will be employed in consuming goods and services, including not only food and household goods, but also communications media, travel, recreation, housing, insurance, medical and dental care, education, etc.

You can't stop people from trying to sell you things. You can't stop yourself from spending money. You *can* try to get the best value for the money you spend.

Developing Shopping Savvy

Large firms hire professional purchasing agents to do their buying for them. It is up to the purchasing agent to make sure that the best possible value is obtained on items bought by the firm. This means that purchases are acquired not only at the most advantageous price, but that the quality of the goods is appropriate for the function they are to perform. The purchasing agent must also consider promptness of delivery, the record of the selling firm in standing behind the goods or services it provides, the uniformity-of-quality standards, and so on. Achieving a balance between best price, appropriate quality and these other considerations is the chief function of the purchasing agent. Obviously the time it takes to research and analyse these various factors can be a full-time job.

As an individual you can't afford the luxury of hiring a purchasing agent. Most likely you don't have the time to become a professional purchasing agent yourself, as a sideline to your regular job. You can, however, with a little effort, acquire many of the purchasing agent's skills and know-how. Since you work hard for your money, you owe it to yourself to do so.

The purpose of this booklet is to show you some purchasing-agent techniques applied to the purchase of "big-ticket" items, like a home or a car. But these techniques can be applied to anything you buy—the food, clothing, services, necessities and luxuries on which you spend your money.

The basic principle behind getting value for your money is to do some homework before you go shopping. This means, in the first instance, knowing *what* you want to buy.

When you consider making a purchase, know what you want to buy, no more, no less. Merchants and salesmen have a vested interest in selling you what they have. It may or may not be exactly what you want. By doing some research beforehand, either by reading some of the many consumer publications or talking to satisfied friends, you will be in a better position to know exactly what you want.

When you buy is important, too. Almost everything you might want to buy can be had for less if you wait for the most advantageous moment to make your purchase. As in so many instances, time is money.

Why you are buying, is something you ought to ask yourself before every purchase. Whatever the item, do you really want it or need it? If so, do you really want it or need it right now? Is it a real need, or a whim that might pass? You and you alone can decide whether a specific purchase at a specific time is worth whatever additional premium you may have to pay.

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Where you buy can save you money. Competition is supposed to be the basis of our economic system. Sometimes it actually is. Maybe what you want can be bought cheaper somewhere else than is apparent at first glance. Shop around and compare.

But remember:

How much you can save on a particular item is a matter for consideration. Your time is valuable too. There is little point in spending an hour travelling to a store in order to save 10 or 29 cents. Obviously not all savings are going to be equally worthwhile. Only you can decide how much of your time you are willing to spend looking for a bargain. Remember that "cheapest" is not necessarily best. A balance between the time it takes you to do your "homework", and the lowest price you can get for the quality you want, is your best guarantee of getting value for your money.

Building Better Buying Habits

Learning to shop skillfully is just another way of managing your money properly. As with other aspects of money-management, the hardest part is to change some of your life-long patterns of doing things. But the basic principles of intelligent and knowledgeable buying are quite simple. Once you have mastered them, they will provide a solid basis upon which to build better buying habits.

Your reward for acquiring these skills will be more freedom to do more things with the money you have at your disposal. You decide how you want to spend your money—but on the basis of hard facts.

THE INTELLIGENT SHOPPERS' BUYING GUIDE

1 ***Do Your Homework*** before you go shopping. Resist the temptation to buy on impulse. Try not to be influenced by high-pressure tactics into buying more than you want, or something "just the same", or even buying at all before you're ready to.

2 ***Ask Questions.*** Many people are afraid that asking questions will seem to betray their ignorance. Nothing could be further from the truth. Asking questions and getting answers is a sure sign of a knowledgeable buyer.

3 ***Think*** before you buy something new, whether you could be just as happy buying something second hand, or even renting it.

4 ***Check and Compare*** brand names for quality, price, performance and so on. Consult Consumer Reports, Canadian Consumer, Consumers' Guide, to make your comparisons.

5 ***Don't Spend More Money*** than your cash-flow can contain.

6 ***Take Advantage of Seasonal Sales.*** January and August are clearance months. Learn to distinguish between stores that always have "sales", and those that offer genuine discounts from time to time on "feature" items.

7 ***Look for Bargains, and try Bargaining when You Find Them.*** Even if the first store you go into seems to offer a fair price, don't rush to buy. If you shop around, you may very well find what you want somewhere else, and save money.

8 ***Know the Scientific Way to Pay.*** If you pay cash, get a receipt specifying what you've paid for, when, and to whom. If you sign a contract or a bill of sale, make sure you understand exactly what you're signing. Get a copy. Remember, it's a legal contract.

9 ***About Signing on the Dotted Line.*** You are responsible for everything that is listed above your name. Either sign immediately below the last item mentioned, or draw a line through the blank space and sign in the space provided.

10 ***Send in Your Manufacturer's Warranty Immediately.*** Whenever you buy something that may need servicing, make sure you register your purchase with the manufacturer.

11 ***If You Buy Something,*** and aren't satisfied, tell the seller immediately. Return the item as soon as you can. Ask for a replacement or a refund. If you are refused, phone your local Better Business Bureau. Phone or write to the president or some other senior executive. Often, you'll get a surprisingly prompt response.

Mathematics Item Progress Check

UNIT VI: CONSUMER MATH. Name: _____

ITEM F : BUDGETING AND COMPARISON SHOPPING Date: _____

Form 1

Criterion:	18/ 21
Score:	___/___

Problems: In the space below, show the work you do to solve problems. One mark is for your work and one mark is for the correct answer.

1. Given this information about the Burden family:
Salary (take home) Mr. Burden, $625; Mrs. Burden, $375; Family Allowance, $12.00;, Income Tax Refund, $41.75; House Payment, $145.00; Utilities $47.60; Car Payment, $96.00; Oil Company Credit Cards, $26.00; Department Store Charge Accounts, $38.00; Insurance, $22.05; Repair to TV, $19.50; Payment on Bank Loan, $76.00:

Calculate:

(2) a) Total Income _____

(2) b) Total Expenses Listed _____

(2) c) Amount left for Food, Entertainment & Savings _____

2. Mrs. Denem is a deserted housewife with four children to look after. She receives $576/mth. from the Dept. of Health & Welfare, $20/child from Family Allowance and $50 from the Welfare Incentive Program for working with the local food co-op.

Her monthly expenses are: rent, $185; food, $250; clothing, $100; utilities (tel. and light), $35; T.V. payment, $15; dept. store acct., $35; and life insurance, $9.

(2) What is her (a) Total Income _____

(2) (b) Total Expenses _____

(2) (c) Amt. left for Savings & Entertainment _____

(2) 3. A young couple were buying some furniture and were told that if they bought a complete set they would get a reduction of 15%. If they qualified for the reduction by buying a kitchen set for $159.00; a bedroom suite for $329.00; and a chesterfield, chair and lamps, etc., for $475.00; what amount would they pay in total after the discount?

_____

(8) 4. A family has a monthly income of $650.00. Calculate the actual amounts of expenditure given the following percents of the income which are budgeted.

(* ½ mark for your work and ½ mark for the correct answer for each part.)

Taxes	20%	_____
Housing	18%	_____
Food	20%	_____
Transportation	5%	_____
Clothing	10%	_____
Medical & Insurance	15%	_____
Entertainment	5%	_____
Savings	7%	_____

(5) 5. Circle the best answer for each of the following.

1. During the life-time of the average Canadian, when he reaches retirement, he will have earned approximately -

   a. $75,000
   b. $150,000
   c. $300,000
   d. $500,000

2. In 1970, approximately what percentage of the total female labour force were working wives?

   a. 15%
   b. 25%
   c. 35%
   d. 50%

3. If you buy something and aren't satisfied,

   a. tell the seller immediately
   b. ask for a replacement
   c. return the item as soon as possible
   d. all of the above

4. The best months to go shopping are -

   a. January and December
   b. January and August
   c. March and November
   d. March and June

5. A radio which normally sells for $28.50 is offered for sale at 25% off. The "sale" price is -

   a. $6.12
   b. $6.21
   c. $21.37
   d. $22.47

Mathematics Item Progress Check

UNIT VI: CONSUMER MATH Name: _____

ITEM F : BUDGETING AND COMPARISON SHOPPING Date: _____

Form 2

Criterion:	14/17
Score:	___/___

Problems: In the space below show the work you do to solve problems. One mark is for your work, and one mark is for the correct answer answer.

1. Given this information about the Wilson family:

Salaries (take home pay) Mr. Wilson, $490.00
Mrs.Wilson, $280.00

Rent, $125.00; utilities, $42.50; car payment, $81.00;,insurance $18.25; bank loan payment, $45.00; dentist bill, $17.50:

Calculate:

(2) a) total income _____

(2) b) total expenses listed _____

(2) c) amount left for food, clothing, etc. _____

(2) 2. Calculate the amount you can spend for food and other things if you have a take home pay of $575. a month and have to pay the following: rent, $125; light, heat and water, $36.75; department store charge account, $22.00; gasoline credit card, $19.00; dental bill, $12.00; car payment, $76.00; life insurance, $15.75.

_____

(2) 3. Jim saw golf balls advertised to sell for 81 cents each, or at the rate of three for $2.16. How much would he save by buying three balls together instead of buying them one at a time?

(2) 4. At a sale, Mrs. Chan bought 10 cans of apricots at two for 59¢. If the usual price was 36¢ a can, how much money did she save?

(5) 5. Circle the best answer for each of the following.

1. During the life-time of the average Canadian, when he reaches retirement, he will have earned approximately.-

   a. $75,000
   b. $150,000
   c. $300,000
   d. $500,000

2. In 1970, approximately what percentage of the total female labour force were working wives ?

   a. 15%
   b. 25%
   c. 35%
   d. 50%

3. If you buy something and aren't satisfied,

   a. tell the seller immediately
   b. ask for a replacement
   c. return the item as soon as possible
   d. all of the above

4. The best months to go shopping are -

   a. January and December
   b. January and August
   c. March and November
   d. March and June

5. A radio which normally sells for $28.50 is offered for sale at 25% off. The "sale" price is -

   a. $6.12
   b. $6.21
   c. $21.37
   d. $22.47

MATHEMATICS

UNIT VI: CONSUMER MATH

ITEM G: METRIC SYSTEM

Do the work listed below for each objective and check off each step as you complete it.

OBJECTIVES

The student must be able to:

1. Think in terms of the metric system.
2. Use the common metric units of length, weight and liquid capacity.

LEARNING RESOURCES

Booklet: Metrication: A Guide for Consumers, Information Canada

LEARNING ACTIVITIES

The purpose of this Item is to introduce you to the metric system of measurement. You will do some reading and then some actual measurement to become familiar with these new units. There are no Item Progress Checks for this Item.

MEASUREMENT

THINKING METRIC

Soon, in Canada, we are all going to have to think metric. A new system of units will replace our present system with all its yards, feet, gallons, quarts, rods, furlongs, etc.

The new system of units is called S.I. metric units because it has been agreed to internationally. The letters S.I. stand for International System (Système International). Many countries have been using the metric system for a long time, while other countries e.g. Japan, India and Great Britain have only recently 'gone metric'.

Using the metric system means using millimetres and metres instead of inches, feet and yards; grams and kilograms instead of ounces and pounds, and litres instead of pints, quarts and gallons. It is a decimal system, which means it is based on tens instead of numbers such as twelve, three, two and four which we now use. The idea should not be difficult to understand since we have all had plenty of practice with a decimal system of currency. In spite of the fact that the metric system has been legal in Canada for many years and is already in use in some specialized industries, it will probably take about ten years to make the change.

Some of the advantages for changing to the metric system include:

1. Improved export trade with metric countries.
2. The metric system (SI) has a few easily defined units.
3. All multiples and submultiples are in simple powers of ten.
4. There is a direct relationship between the units of length, volume and weight.
5. The multiples and submultiples generally accord with our accepted counting system.
6. Most of the other countries of the world are already metric.

Some units of the metric system are already used in Canada.
e.g. - engine volumes are shown in cubic centimetres (c.c.)
- hospitals weigh patients in kilograms (kg)
- we hear of European 2½ litre engines

We now have: metre - the basic unit of length
kilogram - the basic unit of weight
litre - the basic unit of capacity
Let us think in these measurements.

The most common ones we shall need have the following prefixes.

kilo - meaning one thousand (1000)

e.g. 1 kilogram = 1000 grams
1 kilometre = 1000 metres
1 kilolitre = 1000 litres

centi - meaning one hundredth (1/100 or .01)

e.g. 1 centigram = 1/100 gram
1 centimetre = 1/100 metre
1 centilitre = 1/100 litre

milli - meaning one thousandth (1/1000 or .001)

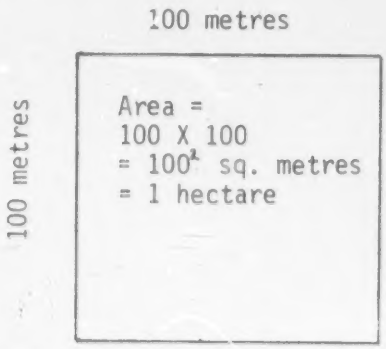
e.g. 1 milligram = 1/1000 gram
1 millimetre = 1/1000 metre
1 millilitre = 1/1000 litre

Hecta (meaning 100) and deka (meaning 10) and deci (meaning 1/10 or .1) are not so often used.

For units of length, in order from the smallest to the largest, there are:

	mm	(millimetres)
	cm	(centimetres)
	dm	(decimetres)
	m	(metres)
less often used	dkm	(dekametres)
	hm	(hectometres)
	km	(kilometres)

Just as area was measured in square feet, square inches, etc., so area in metric units is measured in square centimetres, square metres, etc. The area of land is measured in hectares.



Volume, which has been measured in cu. in. and cu. ft., is measured in the metric system in cubic centimetres, cubic metres, etc.

Capacity, instead of gallons, quarts, pints, etc., is measured in centilitres, litres, kilolitres, etc.

If you want to compare:

one litre - about a quart
one kilogram - about two pounds
one metre - about a yard (3" more)
But don't waste time comparing.

One of the problems of metric changeover which is common to everybody is the ability to think in metric units. A good example of this is the difficulty experienced when trying to change from Fahrenheit to Celsius temperature measurement. Most people seem to retain a feel for the Fahrenheit value. Thinking in metric is thinking what the magnitude of the unit means. To successfully operate in the metric system we need to know automatically what 10 millimetres or 10 centimetres looks like and be able to compare it to some everyday item such as the width of the handle or the height of an average coffee mug. We must develop ideas for comparison such as 20 millimetres is about the width of a finger or 100 millimetres the width of a hand.

The following is a table of commonly used items expressed in their customary units together with the probable metric equivalent which may be used.

Items	Customary Units	New Metric Units
1. Clothing	inches sizes by numbers	centimetres sizes by numbers
2. Cooking Utensils	spoons	millilitres
3. Wall Paper	yards	metres
4. Paints	quarts) pints) gallons)	litres
5. Carpets and Tiles	yards feet inches	centimetres decimetres metres

Items	Customary Units	New Metric Units
6. Yard Goods for Drapes, Bedding and Table Cloths	inches feet yards	centimetres decimetres metres
7. Sports such as, track and field, horse racing, football, baseball	yards	Will probably stay the same for a long time, but eventually change to metres
8. Shoes	Sizes based on inches	Sizes based on centimetres by international agreement
9. Groceries such as:		
Meats	pounds	kilograms
Cans	ounces (fluid)	grams
Bottles	ounces (fluid)	millilitres
Milk	quarts	litres
Butter	pounds	kilograms
10. Baked Goods	ounces (weight)	grams
Fruits and Vegetables	pounds	grams
11. Hardware and Lumber	inches feet	millimetres metres
12. Paper for writing and wrapping	inches	Special International Sizes in millimetres

Now read the booklet 'Metrication - A Guide for Consumers'. It is put out by the Federal Government, Department of Consumer and Corporate Affairs, and is a good help in introducing everyday uses of the metric system. After reading it, try the following activities.

THI m. K

METRE

CORRECT SPELLING.

Activities (Length)

1. A meter is approximately 3" longer than a yard. Take a strip of newspaper and cut your own meter stick (estimate) without actually measuring it. Then compare with metre--add or subtract to make yours accurate. Divide this into 10 equal parts (decimetres which are not in general use). These 10 decimetres are further divided into 10 centimetres which we shall use for all small measurements.

2. Measure (approximately with your paper metre stick)

   a) width of your desk
   b) width of a door
   c) your height
   } metres

   d) width of your hand
   e) length of your foot
   f) circumference of your head
   } centimetres

3. Try to find accurate measurement of a few common things. Try to impress the length of these articles in your mind to use them as future approximation guides. E.g. length of your forefinger (from thumb to tip) = 10 cm. --then

   compare this measurement to other objects.

4. Get a partner and between the two of you select a list of objects (large and small). First each make an estimate of the length and then take an accurate measurement with real metric stick. How accurate were you?

5. For more academic activity change your above accurate measurements from cm. to m. and m. to cm. (1 metre = 100 centimetres)
   e.g. 6 cm. = .06 m.
   75 m. = 7500 cm.

6. A kilometre is approximately 5/8 of a mile. A mile is 8/5 of a kilometre.

   a) About how many kilometres between Hope and Vancouver if it is 95 miles? (to convert km. to mi. multiply miles X 8/5)

   b) What distance (in km.) does a runner cover in a 15 mile long cross country run?

   c) In Europe, Paris is 24 kilometres from a small village. How many miles is Paris from the village? (to convert to km. multiply by 5/8)

7. For homework:

   a) measure length and width of your lot
   b) how large is your living room?
   c) how many cm. long is your butcher knife?
   d) how tall is your smallest child? husband?
   e) measurements of your front door

Activities - Weight

1 kilogram = 1000 gram

1 kilogram = 2.2 pounds

1. Get out the metric weight set and lift the different weights. Estimate the weights in grams or kilograms and compare with the actual weights.

2. Get out a metric scale (if there is one) and a triple beam balance and spring balance.

   a) Weigh yourself (compare with your friends if you wish)
   b) Get various articles in the room. Estimate their weights and verify your finding on the balances.

3. From various items you have at home or if you are going to the store in the near future make a list of the items which display their weight in metric only and those products that display both systems. Record the weights. E.g. cereal, orange juice.

4. If you are interested in changing your weight in pounds, to kilograms, multiply your weight by .45. (1 pound = .45 kg.)

   NOTE: 1 metric ton = 1000 kilograms

Activities - Liquid Capacity

1 kilolitre = 1000 litres

1 litre = 1000 millilitres

1. Get out large and small beakers. Pour water into an ordinary glass. Pour this water into a beaker. Record the millilitres (ml).

2. Get a milk container. Pour water into it and see how many beakers you fill. Add up the millilitres. How many litres is this?

3. How many litres of milk does your family drink in a day? a week?

4. Measure the amount of coffee in your coffee cup in millilitres. How many litres of coffee a day do you drink?

5. A large family drinks 3 litres of milk a day. How many kilolitres of milk would this family drink in one year?

NOTE: i) 1 litre = 1 cubic decimetre

ii) 1 millilitre = 1 cubic centimetre

iii) 1 cubic centimetre of water weighs 1 gram

When you have completed these activities you will have finished the unit on Consumer Math. You will then be ready to write Diagnosis VII.

Mathematics Diagnosis

UNIT VII: MEASUREMENT

NAME: _____

DATE: _____

1. List of units of measurements:

1. feet	6. quarts	11. cups	16. pints
2. hours	7. months	12. centuries	17. years
3. days	8. inches	13. gallons	18. miles
4. pounds	9. minutes	14. tons	19. weeks
5. ounces	10. yards	15. seconds	20. fluid ounces

In the space at the right, write the number of the above units of measurements, which are units of:

a. time _____ A-1

b. distance _____ B-1, B-2

c. liquids _____ C-1, C-2

d. weight _____ D-1, D-2

2. Fill in the blanks. A-2

a. 1 hour = ____ seconds
b. 1 day = ___ hours
c. 1 week = ___ days
d. 1 month = ___ weeks
e. 1 year = ___ months
f. 1 century = ___ years

3. Write abbreviations for: A-3

a. seconds ___
b. hours ____
c. days _____
d. weeks ____
e. months ____
f. years _____

4. Convert the following times to 24-hour clock times. OBJECTIVE

a. 5 p.m. _____ c. 7:30 a.m. _____ A-4

b. 9:50 p.m. _____

5. Convert the following 24-hour clock times to 12-hour clock times. A-5

a. 2250 _____ b. 0800 _____

6. Add.

a. 5 hr. 4 min.
2 hr. 40 min. b. 3 hr. 50 min.
40 min. A-6

7. Subtract.

a. 4 hr. 40 min.
1 hr. 20 min. b. 2 hr. 25 min.
1 hr. 40 min. A-6

8. a. 3 hours later than 2:30 p.m. is _____ A-6

b. $2\frac{1}{4}$ hours earlier than 4 p.m. is _____

9. Subtract these 24-hour clock times.

a. 0040 (May 12) - 2200 (May 11) = _____ A-6

b. 0815 - 0730 = _____

10. State three time zones in Canada.

_____ A-7

_____

_____

11.

a. If it is 8 a.m. in Vancouver, what time is it in Halifax?

_____ A-8

b. If it is 1 p.m. in Winnipeg, what time is it in Toronto?

_____

c. If it is 8 p.m. in Ottawa, what time is it in Edmonton?

_____

12. What time should you leave for a movie which begins at 9:10 p.m., if it takes $1\frac{1}{2}$ hour to get to the theatre? Show your work. A-9

13. Fill in the blanks.

a. 1 foot = ____inches

b. 1 yard = ____ feet B-2

= ____ inches

c. 1 mile = ____ yards

= ____ feet

14. Write abbreviations for each of the following.

a. inches _____ c. feet _____ B-3

b. yards _____ d. mile _____

15. Fill in the blanks.

a. 1 2/3 yd. = _____ft. d. ¼ mile = _____yards

b. 30 inches = _____ft. e. 2 ft. 10 in. = _____in. B-4

c. 4 ft. = _____in.

16. a. Add

2 ft. 3 in.
4 ft. 10 in.

b. Subtract

12 ft.
8 ft. 6 in.

B-5

17. Measure the line below to the nearest 1/16 inch.

_____ _____in. B-6

18. A twelve-foot board is to be cut into two 2-foot pieces and the rest into 3 other equal pieces. How long in inches will the three other pieces be?

Show your work. B-7

_____

19. Travelling by car at 60 miles per hour for 3 hours you would go _____ miles. Show your work. B-7

20. A trip of 225 miles took 4½ hours. What was the speed travelled at? Show your work. B-7

21. How many feet per second would you be going at 60 miles per hour? Show your work. B-7

22. Fill in the blanks. C-2

a. 1 cup = _____ fluid ounces

b. 1 pint = _____ cups

c. 1 quart = _____ pints

d. 1 gallon = _____ quarts = _____ fluid ounces

23. Write the abbreviations for the following C-3

a. fluid ounce _____

b. cup _____

c. pint _____

d. quart _____

e. gallon _____

24. Fill in the blanks. C-4

a. 1½ quarts = _____ cups

b. 5 fluid ounces = _____ cup

c. 2½ gallons = _____ quarts

25. a. Add.

2 qt. 1 pt.
1 qt.

b. Subtract.

4 qt.
1 qt. 1 pt.

C-5

26. A 12 fluid ounce can of soup costs 27¢ and a 28 ounce can of the same kind of soup costs 65¢. Which can of soup is the best buy per ounce? Show your work_____

C-6

27. Fill in the blanks.

a. 1 pound = _____ ounces b. 1 ton = _____ pounds

D-2

28. Write abbreviations for the following.

a. ounce _____

b. pound _____

c. ton _____

D-3

29. Fill in the blanks. D-4

a. 1½ tons = _____ pounds

b. 4,500 pounds = _____ tons

c. 24 ounces = _____ pounds

30. a. Add D-5

2 lb. 3 oz.
6 lb. 10 oz.

b. Subtract

9 lb. 10 oz.
7 lb. 12 oz.

31. How much has a baby gained which weighed 6 lb. 8 oz. at birth and is now 11 lb. 3 oz.? D-6

_____

32. A family of 4 wishes to have 6 ounces of meat for each member. How many pounds should they buy? Show your work. D-6

_____

33. A large economy size box of soap which has a net weight of 36 ounces costs 90 cents while the family size of 24 ounces costs 48 cents. What is the cost per ounce in each size? Show your work. D-6

Cost per ounce - large _____ Family _____

Which is the best buy? _____

UNIT VII: MEASUREMENT

ITEM A: TIME

OBJECTIVES

The student must be able to:

1. Identify seconds, minutes, hours, days, weeks, months, years, and centuries as units of time.
2. Define a unit of time in terms of a given unit (e.g., 1 minute is 60 seconds).
3. Read and write the abbreviations for seconds (sec.), minutes (min.), hours (hr.), days (da.), weeks (wk.), and years (yr.).
4. Convert 12-hour clock times to 24-hour clock times.
5. Convert24-hour clock times to 12-hour clock times.
6. Add and subtract 12-hour clock times and 24-hour clock times including cases in subtraction where borrowing is required.
7. State the time zones in Canada.
8. State the time in one part of Canada given the time in another part.
9. Use time readings and calculations in solving word problems.

LEARNING RESOURCES

BOOKS: Basic Mathematics, Bouman and Lindsay

Refresher Mathematics, Stein

Mathematics, A Basic Course, Cambridge Book Company

LEARNING ACTIVITIES

If you missed any of objectives 1, 2 or 3 on the Diagnosis, get a copy of Refresher Mathematics and read pages 405 and 406. Then do Diagnostic Test A on page 406 (odd numbers only) and check your answers with those in the back of the book. Do sets in the "related practice examples" on pages 407 and 408 which correspond to the questions you missed on the Diagnostic Test (for example, if you missed question 3, do set 3 as an exercise). Check your answers.

If you missed any of objectives 4, 5 or 6 on the Diagnosis, read about the "24 hour clock" on page 412 and do the odd numbered sets on page 413. Check your answers.

If you missed either objective 7 or 8 in the Diagnosis, read about "time zones" on pages 356 and 357 and do exercises 1, 3 and 5 on page 357. Check your answers.

If you missed objective 9 on the Diagnosis, turn to page 411 and do "Related Problems" 1, 3 and 5. Then do "Related Applications on page 413, problem 1, and problem 3 on page 414. Check your answers.

If your work is correct to this stage, you are ready to write Item Progress Check VII A. Form 1. If you need further assistance, use one or more of the following:

Objective	Source Materials	Page(s)	Content
1,2,3, 6,9	Basic Mathematics	351-355	Information & exercises
1,2,3	Refresher Mathematics	409-411	Information & exercises
1,2,3	Mathematics, A Basic Course	140,141	Information & exercises

After you have written Item Progress Check VII A, Form 1, and have met the criterion, go on to the next Item as indicated on your Diagnosis. If you do not meet the criterion, select additional work from the above table and, after completing it, write Item Progress Check VII A, Form 2. If you now meet the criterion, go on to the next Item shown on your Diagnosis. If not, see your instructor.

If you have now completed all the work in Unit VII, you are ready to write Unit VII Progress Test, Form 1. If you meet the criterion, you have completed the "core" part of the math programme. Discuss your goals with your instructor to see if you should do some of the math **options**. If you do not meet the criterion on the Unit Progress Test, see your instructor.

Mathematics Item Progress Check

UNIT VII: MEASUREMENT Name: _____

ITEM A: TIME Date: _____

Form 1

Criterion:	17/ 18
Score:	___/ ___

(1) 1. Check (✓) the words below which are units of time.

____feet ____seconds ____pounds ____hours

(5) 2. Fill in the blanks.

a. 1 min. = _____sec. d. 2½ hr. = _____min.

b. 1 wk. = _____da. e. 18 mo. = _____yr.

c. 1 yr. = _____da.

(2) 3. Write these 12-hour clock times in 24-hour clock times.

a. 7:15 a.m. _____ b. 8:50 p.m._____

(2) 4. Write these 24-hour clock times in 12-hour clock times. (Be sure to include a.m. or p.m. in your answers.)

a. 2240 _____ b. 0230 _____

(4) 5. a. Add. 5 hr. 3 min.
2 hr.51 min.

b. Subtract. 1 hr. 40 min.
45 min.

c. 2½ hours earlier than 3:15 p.m. is _____.

d. 4½ hours later than 11:30 a.m. is _____.

(3) 6. State any three time zones in Canada.

_____

_____

_____

(1) 7. If it is 5 p.m. in Ottawa, what time is it in Vancouver?

_____

Mathematics Item Progress Check

UNIT VII: MEASUREMENT Name: _____

ITEM A: TIME Date: _____

Form 2

Criterion:	16/ 18
Score:	___/ ___

(1) 1. Check (√) the words below which are units of time.

___miles ___days ___years ___gallons

(5) 2. Fill in the blanks.

a. 1 hr. = _____min. d. 1 mo. = _____yr.

b. 1½ min. = _____sec. e. 90 sec. = _____ min.

c. 1 century = _____yr.

(2) 3. Write these 12-hour clock times in 24-hour clock times.

a. 1:30 a.m. _____ b. 12:01 p.m. _____

(1) 4. Write these 24-hour clock times in 12-hour clock times. (Be sure to include a.m. or p.m. in your answers.)

a. 1950 _____ b. 1251 _____

(4) 5. a. Add. 6 hr. 35 min.
1 hr. 25 min.

b. Subtract. 2 hr. 10 min.
1 hr. 50 min.

c. 30 minutes later than 2:45 p.m. is _____.

d. 10 hours earlier than 5:15 p.m. is _____.

(3) 6. State any three time zones in Canada.

_____

_____

_____

(1) 7. If it is 5 p.m. in Calgary, what time is it in B.C.?

_____

MATHEMATICS

UNIT VII: MEASUREMENT

ITEM B: DISTANCE

OBJECTIVES

The student must be able to:

1. Identify inches, feet, yards and miles as units of distance in the imperial system.
2. Define a unit of distance in terms of a given unit (i.e. 1 foot = 12 inches).
3. Read and write abbreviations for inches (in.), feet (ft.), yards (yd.), and miles (mi.).
4. Convert one unit of distance to another unit in the imperial system.
5. Add and subtract units of distance including cases where borrowing is required.
6. Measure a given distance with a ruler or tape; measure to the nearest 1/16 inch.
7. Use distance measurements in solving word problems (including problems involving time and distance).

LEARNING RESOURCES

Books: **Basic Mathematics**, Bouman and Lindsay

Refresher Mathematics, Stein

Mathematics, A Basic Course, Cambridge Book Company

General Mathematics, Ginn and Company

LEARNING ACTIVITIES

If you missed any of objectives 1, 2, 3 or 4 on the Diagnosis, get a copy of Refresher Mathematics and read pages 296 to 298. Then do Diagnostic Test A on page 299 (do odd numbered questions only and omit questions 7, 11, 15, 29, 31, and 39). Check your answers with those in the back of the book. Do sets in the "related practice examples" on pages 300 to 303 which correspond to the questions you missed on the Diagnostic Test (for example, if you missed question 3, do set 3 as an exercise). Check your answers.

If you missed objective 5 on the Diagnosis, get a copy of Basic Mathematics and look at the examples in the middle of page 336. Then do exercise 4 (a to g). Notice the examples at the top of page 337 and do exercise 5 (a to j). Check your answers with those in the back of the book.

If you missed objective 6 on the Diagnosis, get a copy of General Mathematics and read pages 265 and 266. Then get a copy of Basic Mathematics, read over page 333 and do exercise 11-5 on page 333. Check your answers with those in the back of the book.

If you missed objective 7 on the Diagnosis, get a copy of Refresher Mathematics and read pages 456 and 457. Then do "related practice examples" on page 458, set 1(a) and set 1(d). Then do set 3 and 5 on page 459. Check your answers with those in the back of the book. Then do the following problems on pages 461 and 462: 1, 3, 5, 9 and 15. Check your answers. If you have difficulties, select additional problems from pages 461 and 462.

If your work is correct to this stage, you are ready to write Item Progress Check VII B, Form 1. If you need further assistance, use one or more of the following:

Objective	Source Materials	Page(s)	Content
1,2,3,4	Basic Mathematics	333-335	Information & exercises
6	Refresher Mathematics	309	Information & exercises
1,2,4,6	Mathematics, A Basic Course	126-134	Information & exercises
5	Mathematics, A Basic Course	141-144	Information & exercises
1,2,3	General Mathematics	261	Information
7	General Mathematics	264	Problems

After you have written Item Progress Check VII B, Form 1, and have met the criterion, go on to the next Item as indicated on your Diagnosis. If you do not meet the criterion, select additional work from the above table and, after completing it, write Item Progress Check VII B, Form 2. If you now meet the criterion, go on the the next Item shown on your Diagnosis. If not, see your instructor.

If you have now completed all the work in Unit VII, you are ready to write Unit VII Progress Test, Form 1. If you meet the criterion, you have completed the "core" part of the math program. Discuss your goals with your instructor to see if you should do some of the math options. If you do not meet the criterion on the Unit Progress Test, see your instructor.

Mathematics Item Progress Check

UNIT VII: MEASUREMENT Name: _____

ITEM B: DISTANCE Date: _____

FORM 1

Criterion:	15/ 16
Score:	___/ ___

(1) 1. Check (√) the words below which are units of distance.

___feet ___seconds ___miles ___gallons

(6) 2. Fill in the blanks.

a. 1 ft. = ___in. d. 1 yd. = ___in.

b. 2½ feet = _____ in. e. 1¼ mi. = _____ yd.

c. 30 yd.= ___ft. f. 64 in.= ___ft.

(2) 3. a. Add. 3 yd. 2 ft. 5 in.
4 yd. 1 ft. 8 in.

b. Subtract. 4 ft.
2 ft. 6 in.

(1) 4. Measure the line to the nearest $\frac{1}{16}$ inch.

_____ = ___in.

Problems: In the space below, show the work you do to solve problems. One mark is for your work and one mark is for the correct answer.

(2) 5. How long are each of the pieces when a 2 foot board is cut into 4 equal pieces?

_____

(2) 6. How long will it take to go 170 miles at a speed of 40 miles per hour?

_____

(2) 7. If in your town the blocks are 150 yards long, how many blocks, (to the nearest block), are there in a mile?

_____

MATHEMATICS

UNIT VII: MEASUREMENT Name: _____

ITEM B: DISTANCE Date: _____

FORM 2

Criterion:	14/ 16
Score:	___/ ___

(1) 1. Check (/) the words below which are units of distance.

___seconds ___miles ___ yards ___pounds

(6) 2. Fill in the blanks.

a. 12 in. = ___ft.

b. 3½ ft. = ___in.

c. 5 mi. = ___ft.

d. 1 km. = ___m.

e. 126 in. = ____ yd.

f. 5 $\frac{1}{3}$ yd. = ___ft.

(2) 3. a. Add. 5 yd. 2 ft. 8 in.
8 yd. 2 ft. 9 in.

b. Subtract. 1 ft. 6 in.
9 in.

(1) 4. Measure the line to the nearest $\frac{1}{16}$ in.

_____ = ___in.

Problems: In the space below, show the work you do to solve problems. One mark is for your work and one mark is for the correct answer.

(2) 5. How many yards of ribbon are required when seven 2 foot pieces are needed?

(2) 6. What speed would you have to travel to go 140 miles in 3½ hrs.?

(2) 7. If each step in a stairway is 8" higher than the one below it, how many feet is it from the main floor to next floor if there are 30 steps?

MATHEMATICS

UNIT VII: MEASUREMENT

ITEM C: LIQUID

OBJECTIVES

The student must be able to:

1. Identify fluid ounces, cups, pints, quarts and gallons as units of liquid measure in the imperial system.
2. Define a unit of liquid measure in terms of a given unit (i.e. 1 quart = 2 pints).
3. Read and write abbreviations for fluid ounces (fl. oz.), cups (c.), pints (pt.), quarts (qt.), and gallons (gal.).
4. Convert one unit of liquid measure to another unit in the imperial system.
5. Add and subtract units of liquid measure including cases where borrowing is required.
6. Use liquid measurements in solving word problems, (including problems where cost per unit of liquid is required to determine best value.)

LEARNING RESOURCES

Books: Refresher Mathematics, Stein

Mathematics, A Basic Course, Cambridge Book Company

General Mathematics, Ginn and Company

LEARNING ACTIVITIES

If you missed any of objectives 1, 2, 3 or 4 on the Diagnosis, get a copy of Refresher Mathematics and read pages 391 and 392. Do the Diagnostic Test on page 392 (odd numbers only) and check your answers with those in the back of the book. Do sets in the "related practice examples" on pages 392 to 394 which correspond to the questions you missed on the Diagnostic Test (for example, if you missed question 3, do set 3 as an exercise). Check your answers.

If you missed objective 5 on the Diagnosis, get a copy of Mathematics, A Basic Course, and read over "working with measures" on page 141 and the examples on page 142. Then do the following exercises on page 143: j, S, and bb. Then read about "Subtracting Measures" at the bottom of page 143 and the example on page 144. Then do question e in the exercise on page 144. Check your answer.

If you missed objective 6 on the Diagnosis, get a copy of Refresher Mathematics and do problems 1, 3 and 5 on page 394 and problems 7, 11 and 13 on page 395. Check your answers with those in the back of the book.

If your work is correct to this stage, you are ready to write Item Progress Check VII C, Form 1. If you need further assistance, use one or more of the following:

Objective	Source Materials	Page(s)	Content
1,2,4	Mathematics, A Basic Course	136-139	Information & exercises
1 to 4	General Mathematics	330-331	Information & exercises

After you have written Item Progress Check VII C, Form 1, and have met the criterion, go on to the next Item as indicated on your Diagnosis. If you do not meet the criterion, select additional work from the above table and, after completing it, write Item Progress Check VII C, Form 2. If you now meet the criterion, go on to the next Item shown on your Diagnosis. If not, see your instructor.

If you have now completed all the work in Unit VII, you are ready to write Unit VII Progress Test, Form 1. If you meet the criterion, you have completed the "core" part of the math program. Discuss your goals with your instructor to see if you should do some of the math options. If you do not meet the criterion on the Unit Progress Test, see your instructor.

Mathematics Item Progress Check

UNIT VII: MEASUREMENT Name: _____

ITEM C: LIQUID Date: _____

Form 1

Criterion:	13/ 14
Score:	___/___

(1) 1. Check (✓) the words below which are units of liquid measurement.

___pounds ___gallons ___ yards ___quarts

(4) 2. Fill in the blanks.

a. 1 gal. = ___pt. c. 1 qt. = ___l.

b. 1 pt. = ___fl. oz. d. 2½gal.= ___qt.

(2) 3. a. Add. 2 qt. 1 pt. / 3 qt. 1 pt.

b. Subtract. 2 gal. 2 qt. / ___ 3 qt.

(5) 4. Find the cost per fl. oz. in each of the following to the nearest 1/10 cent.

a. 10 fl. oz. for 15 cents _____

b. 12 fl. oz. for $2.12 _____

c. 16 fl. oz. for 22 cents _____

d. 48 fl. oz. for 35 cents _____

e. 2.5 fl. oz. for 88 cents _____

Problems: In the space below, show the work you do to solve problems. One mark is for your work and one mark is for the correct answer.

(2) 5. A 12-fl. oz. bottle of mouthwash costs 79 cents while a 20-fl. oz. bottle cost $1.10. Find the cost per ounce (nearest 1/10 cent) in each and the best buy.

12-fl. oz. _____cents per ounce

20-fl. oz. _____cents per ounce

Best buy _____

Mathematics Item Progress Check

UNIT VII: MEASUREMENT Name: _____

ITEM C: LIQUID Date: _____

Form 1

Criterion:	12/ 14
Score:	___/ ___

(1) 1. Check (√) the words below which are units of liquid measurement.

___miles ___ fluid ounces ___ pounds ___pints

(4) 2. Fill in the blanks.

a. 1 pt. = ___fl. oz. c. 5 qt. = ___gal.

b. 2½ qt. = ___pt. d. 2 l. = ___qts.

(2) 3. a. Add. 1 pt. 5 fl.oz.
2 pt. 8 fl.oz.

b. Subtract. 1 gal. 1 qt.
3 qt.

(5) 4. Find the cost per fl. oz. in each of the following to the nearest 1/10 cent.

a. 28 fl. oz. for 30 cents _____

b. 32 fl. oz. for $12.40 _____

c. 12 fl. oz. for 75 cents _____

d. 8 fl. oz. for 10 cents _____

e. 4½ fl. oz. for $1.00 _____

Problems: In the space below, show the work you do to solve problems. One mark is for your work and one mark is for the correct answer.

(2) 5. A soft drink in a 10-fl. oz. bottle costs 15 cents and the same drink in a 24-fl. oz. bottle costs 32 cents. What is the cost per fl. oz. in each? (nearest 1/10 cent)

10-fl. oz. _____

24-fl. oz. _____

510

UNIT VII: MEASUREMENT

ITEM D: WEIGHT

OBJECTIVES

The student must be able to:

1. Identify ounces, pounds, and tons as units of weight measure in the imperial system.
2. Define a unit of weight measure in terms of a given unit. (i.e. 1 pound = 16 ounces, 1 short ton = 2000 pounds)
3. Read and write abbreviations for ounces (oz.), pounds (lb.), and tons (T.).
4. Convert one unit of weight measure to another unit in the imperial system.
5. Add and subtract weight measures including cases where borrowing is required.
6. Use weight measurements in solving word problems (including cases where cost per unit of weight is required to determine best value.)

LEARNING RESOURCES

Books: Refresher Mathematics, Stein

Mathematics, A Basic Course, Cambridge Book Company

General Mathematics, Ginn and Company

LEARNING ACTIVITIES

If you have missed any of objectives 1, 2, 3 or 4 on the Diagnosis, get a copy of Refresher Mathematics and read pages 400 and 401. Then do the Diagnostic Test on page 401 (odd numbers only) and check your answers with those in the back of the book. Do sets in the "related practice examples" on pages 401 and 402 which correspond to the questions you missed on the Diagnostic Test (for example, if you missed question 3, do set 3 as an exercise). Check your answers.

If you missed objective 5 on the Diagnosis, get a copy of Mathematics, A Basic Course, and read over "working with measures" on page 141 and the examples on page 142. Then do the following exercises on page 143: h, i, q, and z. Check your answers with the separate answer key. Then read about "Subtracting Measures" at the bottom of page 143 and the example on page 144. Then do questions a, f, and i on page 144. Check your answers.

If you missed objective 6 on the Diagnosis, get a copy of Refresher Mathematics and do problems 1, 3, and 5 on page 403. Check your answers with those in the back of the book.

If your work is correct to this stage, you are ready to write Item Progress Check VII D, Form 1. If you need further assistance, use one or more of the following:

Objective	Source Materials	Page(s)	Content
1,2,4	Mathematics, A Basic Course	136,137	Information & exercises
5	Refresher Mathematics	424 set 8 + 9 426 set 8 + 9	Adding and subtracting
6	Refresher Mathematics	403 No. 7,9	Problems

After you have written Item Progress Check VII D, Form 1, and have met the criterion, go on to the next Item as indicated on your Diagnosis. If you do not meet the criterion, select additional work from the above table and, after completing it, write Item Progress Check VII D, Form 2. If you now meet the criterion, go on to the next Item shown on your Diagnosis. If not, see your instructor.

If you have now completed all the work in Unit VII, you are ready to write Unit VII Progress Test, Form 1. If you meet the criterion, you have completed the "core" part of the math program. Discuss your goals with your instructor to see if you should do some of the math options. If you do not meet the criterion on the Unit Progress Test, see your instructor.

Mathematics Item Progress Check

UNIT VII: MEASUREMENT Name: _____

ITEM D: WEIGHT Date: _____

Form 1

Criterion:	14/ 15
Score:	___/ ___

(1) 1. Check (√) the words below which are units of weight measure.

___fluid ounces ___pounds ___yds. ___ quarts

(4) 2. Fill in the blanks.

a. 1 lb. = ___oz. c. 5 lb. = _____oz.

b. 1000 lb. = ___T. d. 48 oz. = _____lb.

(2) 3. A. Add. 2 T. 400 lb. b. Subtract. 13 lb. 5 oz.
1 T. 1600 lb. 2 lb. 9 oz.

(2) 4. Find the cost per ounce in each of the following to the nearest cent.

a. 12 oz. cost 48 cents _____

b. 1 lb. costs $1.28 _____

(2) 5. Find the cost per pound in each of the following to the nearest cent.

a. 25 lb. costs $5.00 _____

b. 2½ lb. costs $1.20 _____

Problems: In the space below, show the work you do to solve problems. One mark is for your work and one mark is for the correct answer.

(2) 6. If the freight charges on a certain carrier are $5.00 per 100 pounds, what will it cost to ship a crate of furniture weighing 750 pounds?

_____

(2) 7. Which is the best buy of toothpaste at 89 cents for 6 oz. or $1.15 for 10 oz.?

_____

514

Mathematics Item Progress Check

UNIT VII: Measurement Name: _____

ITEM D: WEIGHT Date: _____

Form 2

Criterion:	13/ 15
Score:	___/ ___

(1) 1. Check (✓) the words below which are units of weight measure.

___ounces ___pounds ___rods ___pints

(4) 2. Fill in the blanks.

a. 16 oz. = ___lb. c. 2½ lb. = ___oz.

b. 2,000 lb. = ___T. d. 500 lb. = ___T.

(2) 3. A. Add. 9 lb. 3 oz.
4 lb. 5 oz.

b. Subtract. 2 lb.
1 lb. 5 oz.

(2) 4. Find the cost per ounce in each of the following to the nearest cent.

a. 20 oz. costs 60 cents _____

b. 1½ lb. costs 48 cents _____

(2) 5. Find the cost per pound in each of the following to the nearest cent.

a. 10 lb. costs $5.20 _____

b. 32 oz. costs 66 cents _____

Problems: In the space below, show the work you do to solve problems. One mark is for your work and one mark is for the correst answer.

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(2) 6. Calculate the value of stamps required to send a 4 oz. letter at rates of 8¢ for 1 oz. and 6¢ for each additional ounce.

(2) 7. Which is the best buy of toothpaste at 99¢ for 3 oz. or $1.40 for 4 oz.?

MATHEMATICS

UNIT VII: MEASUREMENT

ITEM E: PROBLEM SOLVING

OBJECTIVES

The student must be able to:

1. Apply the steps in solving a problem - that is -
   a. Write what is to be found
   b. Write a word sentence using given facts and telling what is to be found, including what operations are to be used.
   c. Write a number sentence in symbols using given facts and telling what is to be found.
   d. Solve the number sentence (Calculate what is not known).
   e. Write the answer to the original problem.
2. Apply each or all of the above in solving a given problem.

LEARNING RESOURCES

Books: Refresher Mathematics, Stein

Mathematics, A Basic Course, Cambridge Book Company

LEARNING ACTIVITIES

If you have missed either objective 1 or 2 on the Diagnosis, review the objectives listed here and get a copy of Refresher Mathematics. Do problems 1, 3, and 5 on page 430 and do problems 7, 9, and 10 on page 431. Check your answers with those in the back of the book.

If you work is correct to this stage, you are ready to write Item Progress Check VII E, Form 1. If you need further assistance, use one or more of the following:

Objectives	Source Materials	Page(s)	Content
1,2	Refresher Mathematics	403	Weight Problems
1,2	"	394	Liquid Problems
1,2	"	456-462	Distance Problems
1,2	"	411-414	Time Problems
1,2	Mathematics, A Basic Course	128,129, 132,133	Distance Problems
1,2	"	136	Weight Problems
1,2	"	138,139	Liquid Problems
1,2	"	140,141	Time Problems
1,2	"	152,153	Problems

After you have written Item Progress Check VII E, Form 1, and have met the criterion, you are ready to write Unit VII Progress Test, Form 1. If you meet the criterion on Unit VII ProgressTest, you have completed the "core" part of the math programme. Discuss your goals with your instructor to see if you should do some of the math options. If you do not meet the criterion on the Unit Progress Test, see your instructor.

If you do not meet the criterion on Item Progress Check VII E, Form 1, select additional work from the above table and, after completing it, write Item Progress Check VII E, Form 2. If you do not meet the criterion, see your instructor.

If you meet the criterion on the Item Progress Check, you are ready to write Unit VII Progress Test, Form 1. If you meet the criterion on Unit VII Progress Test, you have completed the "core" part of the math programme. Discuss your goals with your instructor to see if you should do some of the math options. If you do not meet the criterion on the Unit Progress Test, see yours instructor.

Mathematics Item Progress Check

UNIT VII: MEASUREMENT Name: _____

ITEM E: PROBLEM SOLVING Date: _____

Form 1

Criterion:	7/ 8
Score:	___/ ___

Problems: In the space below, show the work you do to solve problems. One mark is for your work and one mark is for the correct answer.

(2) 1. If a family buys 3 quarts of milk each day, how many gallons of milk does it buy in one year (365 Days)?

(2) 2. How far can an airplane fly in 4 hours 45 minutes if its average ground speed is 360 m.p.h.?

(2) 3. If a person's height is 1 yd. 2 ft. 9 in., what is their height in inches?

(2) 4. If frying chicken costs 55¢ per pound, what would be the value of a chicken which weighs 2 pounds 12 ounces? (give answer to the nearest cent).

Mathematics Item Progress Check

UNIT VII: MEASUREMENT Name: _____

ITEM E: PROBLEM SOLVING Date: _____

Form 2

Criterion:	7 / 8
Score:	___/ ___

Problems: In the space below, show the work you do to solve problems. One mark is for your work, and one mark is for the correct answer.

(2) 1. If a family buys a 24 ounce loaf of bread each day, how many pounds of bread does it buy in one year (365 days)?

(2) 2. How many quart cartons can be filled from four 10 gallon cans of milk?

(2) 3. How many yards of cloth will be needed to make 8 banners if each banner is to be 1 yd. 2 ft. 5 in. long?

(2) 4. How many 4 ounce bags can be filled from 20 pounds of peanuts?

Mathematics Unit Progress Test

UNIT VII: MEASUREMENT

Name: _____

Form 1

Date: _____

Criterion:	32/ 36
Score:	___/ ___

(4) 1. Fill in the blanks.

a. 1 min. = ___sec.

b. 1 hr. = ___min.

c. 2 hr. 40 min. = ___min.

d. 18 mo. = ___yr.

(1) 2. A time of 2240 on a 24-hr. clock would be _____ on a 12-hour clock.

(1) 3. A bus arrived at a depot at 11:45 a.m. for a 3/4 hour stop. What time would it be due to leave?

_____

(2) 4. a. Add. 2 hr. 40 min.
1 hr. 20 min.

b. Subtract. 5 hr. 30 min.
1 hr. 45 min.

(1) 5. If it is 3 p.m. in Ottawa, what time is it in Vancouver, B.C.

_____

(6) 6. Fill in the blanks.

a. 1 ft. = ___in.

b. 4 ft. = ___yd.

c. 880 yd. = ___mi.

d. 2½ ft. = ___in.

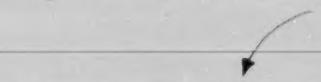
e. 2½ yd. = ____in.

f. 1056 ft. = ____in.

(2) 7. Add. 2 yd. 2 ft. 8 in.
8 yd. 1 ft. 7 in.

Subtract. 8 ft.
2 ft. 6 in.

(1) 8. Measure the line below to the nearest ¼ inch.



_____ = _____ in.

(5) 9. Fill in the blanks.

a. 1 pt. = _____ fl. oz.

b. 4½ qt. = _____ pt.

c. 6 qt. = _____ gal.

d. 1 lb. = _____ oz.

e. 3,600 lb. = _____ ton

f. 120 oz. = _____ lb.

(2) 10. a. Add.
1 qt. 15 fl. oz.
2 qt. 20 fl. oz.

b. Subtract.
3 T. 500 lb.
1 T. 850 lb.

Problems: In the space below, show the work you do to solve problems. One mark is for your work and one mark is for the correct answer.

(1) 11. A bottle with 1 pint of mouthwash costs 90 cents while a small one with 5 fl. oz. costs 35 cents. What is the cost per fl. oz. in each to the nearest 1/10 cent?

(1) 1 pint _____

(1) 5 fluid ounces _____

(1) What is the best buy? _____

(2) 12. If you are planning a trip of 140 miles and think you can cover 55 miles each hour, how much travel time should you plan to the nearest quarter hour?

_____

(2) 13. What time should you set your stove to start cooking a chicken if you want to eat at 5 p.m. and the cooking time is 2¼ hours?

_____

(1) 14. Three 4-oz. bars of soap are selling for 27 cents and three 6-oz. bars are priced at 36 cents. What is the cost per ounce in each?

(2) 4-oz. bars _____ 6-oz. bars _____

Mathematics Unit Progress Test

UNIT VII: MEASUREMENT

Name: _____

Form 2

Date: _____

Criterion:	32/ 36
Score:	___/ ___

(4) 1. Fill in the blanks.

a. 1 min. = ___sec.

b. 1 yr. = ___days

c. 9 mo. = ___yr.

d. $3\frac{1}{6}$ hr. = ___min.

(1) 2. A time of 3:30 p.m. on a 12-hour clock would be_____ on a 24-hour clock.

(1) 3. You put money in a parking meter for 1½ hours at 10:15 a.m. What time must you get back to your car to avoid getting a ticket?

_____

(2) 4. a. Add. 1 hr. 15 min.
2 hr. 40 min.

b. Subtract. 4 hr. 30 min.
45 min.

(1) 5. If it is 8 a.m. in Halifax, what time is it in Calgary, Alberta.

_____

(2) 6. Fill in the blanks.

a. 1 ft. = ____in.

b. 1 mile - ____ft.

c. 2 mi. = ____yd.

d. 5½ ft. = ____in.

e. 2 2/3 yd. = ____ft.

f. 54 in. = ____ft.

(2) 7. a. Add. 4 ft. 6 in.
18 in.

b. Subtract. 2 yd. 1 ft.
1 yd. 2 ft.

(2) 8. How long is this page (top to bottom)?

in inches _____.

in feet _____.

(6) 9. Fill in the blanks.

a. 1 pt. = _____ fl. oz.

b. 2½ pt. = _____ fl. oz.

c. 1500 lb. = _____ ton

d. 7½ qt. = _____ pt.

e. 8¼ gal. = _____ qt.

f. 8 oz. = _____ g.

(2) 10. a. Add.

3 gal. 2 qt. 1 pt.
1 gal. 2 qt. 1 pt.

b. Subtract.

2½ qt.
20 fl. oz.

Problems: In the space below, show the work you do to solve problems. One mark is for your work and one mark is for the correct answer.

(1) 11. A ½ pint bottle of soft drink costs 20¢ while a 7 fluid ounce bottle costs 15¢. What is the cost per fluid ounce in each to the nearest 1/10 cent?

(1) ½ pint _____

(1) 7 fluid ounces _____

(1) Which is the best buy? _____

(2) 12. If you have 24 miles to travel and have 3/4 hour to get there, what speed must you travel?

_____

(2) 13. If you want to drape an 8-ft. wide window and can buy the drapes in the following widths, which will you buy? (check one)

___108 in. ___70 in. ___90 in. ___100 in.

___(1) 14. A 20-pound bag of potatoes costs 89 cents and a 15-pound bag costs 75 cents. What is the cost per pound of potatoes in each bag?

(2) 20-lb. bag _____ 15-lb. bag _____

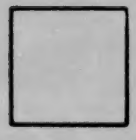
UNIT VIII: PERIMETER, AREA, VOLUME

Name: _____

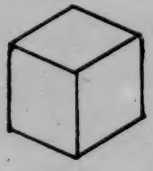
Date: _____

OBJECTIVE

1. Label each of the following as figure or form. — A-1, D-1



a. _____



b. _____

2. Match the following by writing the letter from the left in the correct space at the right. — A-2, D-1

a.	a can of beans	_____	cube
b.	the moon	_____	rectangle
c.	a lump of sugar	_____	cylinder
d.	a shoe box	_____	cone
e.	this sheet of paper	_____	rectangular solid
f.	a funnel	_____	circle
g.	a wheel	_____	sphere

3. Label the following. — A-3

a. _____ b. _____ c. _____ d. _____

e. _____ f. _____ g. _____ h. _____

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OBJECTIVE

4. Write the name in the space at the right for each of the things described. — A-4

   a. A three sided figure. _____

   b. A plane figure of 4 equal sides and square corners. _____

   c. A form which has 6 sides which are rectangles or squares. _____

   d. A form which has 6 sides which are all squares. _____

   e. A figure in which each part of its outer boundary is the same distance from the same point. _____

   f. A form which has a circle for each end. _____

   g. A plane figure which has opposite sides which are equal and ha[illegible] square corners. _____

5. Write the name of each of the indicated parts of the circle in the space at the right. — A-5

6. Draw a rectangle which is 4 centimeters by 2½ centimeters (Use ruler, pencil and set square.) A-6

7. Draw a circle which has a diameter of 2 inches. (Use a compass.) A-7

8. Perimeter is a measure of: (check one) B-1

   a. _____ weight

   b. _____ surface

   c. _____ space

   d. _____ distance or length

9. When we find the perimeter of a figure we are finding the B-2

   _____

10. What is the perimeter of this figure? Use your ruler to measure the figure. B-3

____ inches

11. A square has sides of 8 centimeters. What is its perimeter? Show your work.

Formula: P = _____ B-4

Perimeter: _____

12. What is the perimeter of a rectangle of length 4 ft. and width 3 ft? Show your work.

B-5

Formula: P = _____

Perimeter: _____

13. The length of the circumference of a circle is a measure of the _____ of the circle. B-6

14. The symbol for the constant for all circles which is found by dividing the length of the circumference by the diameter is: (check one) B-7

___ Δ ___ C ___ r ___ π

15. What is the length of the circumference (perimeter) of a circle which has a diameter of 14 miles? B-8

Show your work. Formula: _____

Use $\frac{22}{7}$ for π Perimeter: _____

16. What is the perimeter of a circle which has a radius of 3½ centimeters. Show your work. B-8

Use $\frac{22}{7}$ for π Formula: _____

Perimeter: _____

17. A city block is 300 ft. by 250 ft. What length of sidewalk is required to go around the whole block? Show your work. B-9, E-2

18. A room is 12 m. square. What is the length of the baseboard of this room if 3 meters of one side is a doorway? Show your work. B-9, E-2

19. A bicycle has wheels which are 28 inches in diameter How many times would its wheels turn in going 88 ft.? Show your work. Use $\frac{22}{7}$ for π B-9, E-2

_____

20. Area is a measure of: (check one) C-1

a. _____ weight

b. _____ surface

c. _____ space

d. _____ distance

21. 5 squared means: _____ C-2

_____

22. Write 3 squared in exponential form using numbers. _____ C-3

23. What is the area of a square which has sides of 4 inches? Show your work. C-4

Formula: A = _____

Area: _____

24. State what the square root of 9 means in words. C-5

_____

_____

25. A square has an area of 25 sq. ft. What is the length of its sides? Show your work. C-6

_____

26. What is the area of a rectangle which has a length of 8 meters and a width of 2 meters? Show your work.

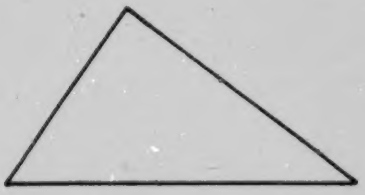
C-7

Formula: A = _____

Area: _____

27. In this triangle the height is _____ inches and the base is _____ in.

C-8



28. A triangle has a base of 6 inches and a height of 4 in. What is its area? Show your work.

C-9

Formula: A= _____

Area: _____

29. What is the area of a circle of radius 21 centimeters? Use $\frac{22}{7}$ for π.

C-10

Formula: A = _____

Show your work.

Area: _____

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30. A room is 15 ft. by 12 ft. What will it cost to put in a new carpet which costs $12.00 per square yard? C-11 E-2

Show your work. _____

31. Volume is a measure of: (check one) D-2

a. _____ weight

b. _____ surface

c. _____ space

d. _____ distance

32. Check those of the following which are forms. D-1

___ triangle ___ cube ___ sphere ___ cylinder

33. Define volume. _____

_____ D-2

34. State the units of volume in common use. _____

_____ D-2

35. What is the volume of a rectangular tank which is 6 m. long, 4 m. wide and 2 m. deep? Show your work.

D-3

Formula: V = _____

Volume: _____

36. A cylindrical juice tin is 3 ½ inches in diameter and 8 inches high. What is its volume? Show your work.
Use $\frac{22}{7}$ for π

Formula: V = _____

D-4

Volume: _____

37. A lawn is 48 ft. by 30 ft. How many gallons of water will be required to cover it 1 inch deep all over if 1 cubic foot contains 6 ¼ gallons? Show your work.

D-5, E-2

_____

MATHEMATICS

UNIT VIII: PERIMETER, AREA, VOLUME

ITEM A : FIGURES AND FORMS

OBJECTIVES

The student must be able to:

1. Identify figures as plane figures which have area and identify forms as objects which have volume.

2. Identify common examples of figures and forms with a figure or form name (i.e., canned soup - cylinder; a room - rectangular solid).

3. Identify squares, rectangles, triangles, circles, cubes rectangular solids, cylinders, cones and pyramids from a set of pictures or objects.

4. Identify squares, rectangles, triangles, circles, cubes, rectangular solids and cylinders given their characteristics.

5. Label the parts of a given circle (circumference, radius, diameter, centre).

6. Use a set square or ruler and compass to draw a rectangle of given dimensions.

7. Draw a circle of given radius or diameter with a compass.

LEARNING RESOURCES

Books: Basic Mathematics, Bouman and Lindsay
Refresher Mathematics, Stein
Mathematics, A Basic Course, Cambridge Book Company
General Mathematics, Ginn and Company

Aids: Set square, ruler and compass

LEARNING ACTIVITIES

If you missed any of objectives 1, 2, 3 or 4 on the Diagnosis, read over the two sheets showing examples of plane figures and forms along with a definition of their characteristics. These two sheets are located in this learning activities booklet.

If you missed any of objectives 5 or 7 on the Diagnosis, see the enclosed sheet describing the parts of a circle. After looking it over, get a pair of compasses and practice drawing circles of various radii and diameters. This can easily be done by measuring the distance between the points of the compass, drawing the circle and then checking the size of the circle with your ruler.

If you missed objective 6 on the Diagnosis, get a copy of Mathematics, A Basic Course, turn to pages 332 and 333, and study "right angles and perpendicular lines". On page 342 study problems 1 and 2. Then make up 2 of your own questions and do the necessary constructions.

If your work is correct to this stage, you are ready to write Item Progress Check VIII A, Form 1. If you need further assistance, use one or more of the following:

Objectives	Source Materials	page(s)	Content
1,2,3,4	Basic Mathematics	297-301 347,348	Information & exercises
5,7	" "	302-303	"
6	" "	318-320	"
1,3,4,5	Refresher Mathematics	313-316	Information
5	General Mathematics	214-215	"
1,2,3,4	Mathematics, A Basic Course	336,337 341,343, 345,346 368,370	Information & exercises
5,7	Mathematics, A Basic Course	365	"

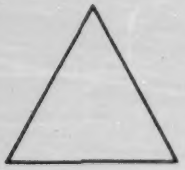
DEFINITIONS

Plane - a flat surface with no limitations.

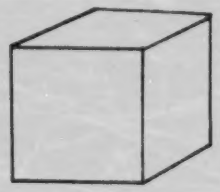
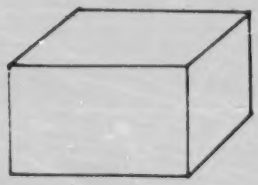
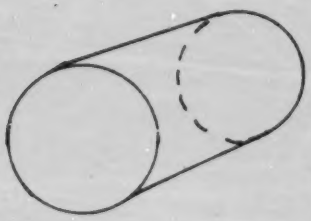
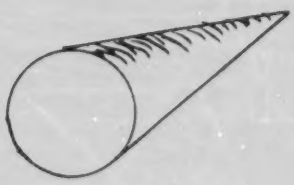
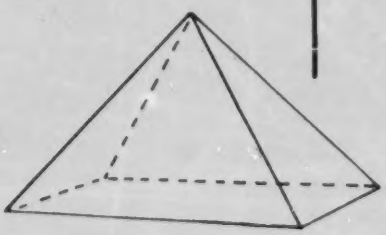
Plane figure - part of a plane whose limits are marked by lines.

Form - the shape of an object, involving length, width and breadth.

A figure only shows the outline of a form.

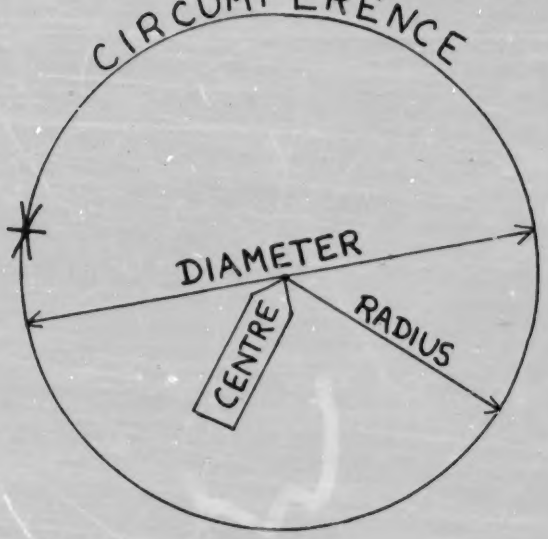
Examples: Plane Figures	Definition of Characteristics:
Triangle 	A plane figure having three sides and three angles.
Circle 	A plane figure bounded by a continuously curving line every point of which is equally distant from a fixed point called the centre.
Square 	A plane figure with four equal sides and four equal angles.
Rectangle 	A four-sided plane figure with four right-angles.

Instructor should give practical examples where applicable.

Examples: Forms	Definition of Characteristics:
Cube 	A solid with six equal square sides.
Rectangular Form 	A solid with at least four rectangular sides.
Cylinder 	A solid with two equal parallel circles.
Cone 	A solid with a flat circular base that tapers evenly to a point.
Pyramid 	A solid having triangular sides meeting at a point.

Instructor should give practical examples where applicable.

Parts of a Circle



Instructor should give practical examples where applicable.

After you have written Item Progress Check VIII A, Form 1, and have met the criterion, go on to the next Item as indicated on your Diagnosis. If you do not meet the criterion, select additional work from the above table and, after completing it, write Item Progress Check VIII A, Form 2. If you now meet the criterion, go on to the next Item shown on your Diagnosis. If not, see your instructor.

If you have now completed all the work in Unit VIII, you are ready to write Unit VIII Progress Test, Form 1. If you meet the criterion, you have completed Unit VIII and may select an additional Math. option if you wish. If you do not meet the criterion on the Unit Progress Test, see your instructor.

Mathematics Item Progress Check

UNIT VIII: PERIMETER, AREA, VOLUME Name: _____

ITEM A : FIGURES AND FORMS Date: _____

Form 1

Criterion:	18 /20
Score:	___/___

(5) 1. Identify each of the following as a figure or form by writing "figure" or "form" beside each.

a. triangle _____ d. cylinder _____

b. cube _____ e. rectangle _____

c. cone _____

(5) 2. What figures or forms are represented by the following objects?

a. a canned soft drink _____

b. a lump of sugar _____

c. a wheel rim _____

d. a dollar bill _____

e. a ball _____

(2) 3. Write the name of the figure or form described.

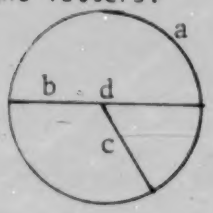
a. Figure with equal sides and square corners.

_____

b. A form with circles at both ends.

_____

(4) 4. In the figure, give the name of the parts indicated by the letters.



a. _____

b. _____

c. _____

d. _____

(2) 5. Draw a rectangle with a length 1" and width $\frac{1}{2}$".

(2) 6. Draw a circle of radius 1 in.

Mathematics Item Progress Check

UNIT VIII: PERIMETER, AREA, VOLUME Name: _____

ITEM A : FIGURES AND FORMS Date: _____

Form 2

Criterion:	17 / 20
Score:	___ / ___

(5) 1. Check (✓) those of the following which are figures.

a. square _____ d. circle _____

b. pyramid _____ e. triangle _____

c. cone _____

(5) 2. What figures or forms are represented by the following objects?

a. dice _____

b. a box _____

c. a can of oil _____

d. this page _____

e. a dime _____

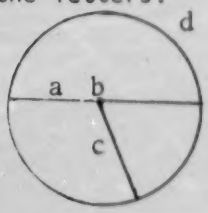
(2) 3. Write the name of the figure or form described.

a. A figure with 3 sides. _____

b. A form which has 6 sides which are all rectangles.

_____

(4) 4. In this figure give the names of the parts indicated by the letters.



a. _____

b. _____

c. _____

d. _____

(2) 5. Draw a rectangle with length 2 in. and width $1\frac{1}{2}$ in.

(2) 6. Draw a circle 4 inches in diameter.

MATHEMATICS

UNIT VIII: PERIMETER, AREA, VOLUME

ITEM B: PERIMETER AND CIRCUMFERENCE

OBJECTIVES

The student must be able to:

1. Identify perimeter as a distance or length measurement and state units used. (in., ft., yd., mi., mm., cm., m.)

2. Define perimeter as the length of the outer boundary of a plane figure.

3. Measure perimeters of given figures by successive ruler measurements.

4. Calculate the perimeter of a given square using the formula $P = 4s$.

5. Calculate the perimeter of a given rectangle using the formula $P = 2l + 2w$.

6. Identify circumference of a circle as a measure of the circle's perimeter.

7. Identify π as a constant for all circles such that $C = \pi d$ or $\frac{c}{d} = \pi$ and as having a value of approximately $3\frac{1}{7}$ or $\frac{22}{7}$

8. Calculate the circumference (perimeter) of a given circle given either radius or diameter and using the formulas $C = 2\pi r$ and $C = \pi D$.

9. Solve routine word problems involving perimeter.

LEARNING RESOURCES

Books: Basic Mathematics, Bouman and Lindsay
Refresher Mathematics, Stein
Mathematics, A Basic Course, Cambridge Book Company
General Mathematics, Ginn and Company

LEARNING ACTIVITIES

If you missed any of objectives 1 to 5 on the Diagnosis, get a copy of Refresher Mathematics and read about "perimeter" on page 317. Look over the example given to find the perimeter of a rectangle and do question 1. Check your answer with that in the back of the book. Then do questions 7 and 9 on page 318. Read about the perimeter of a square on page 318 and do question 1 on page 318. Check your answer.

If you missed any of objectives 6 to 8 on the Diagnosis, read about "circumference" on page 319 and 320. Then do questions 1, 3, 5 and 7 on page 320. Check your answers.

If you missed objective 9 on the Diagnosis, do the following problems: page 317, question 3; page 318, question 3; page 320, question 9; and page 321, questions 11 and 15. Check your answers.

If your work is correct to this stage, you are ready to write Item Progress Check VIII B, Form 1. If you need further assistance, use one or more of the following: (see next page)

Objective	Source Materials	page(s)	Content
1,2,3,4,5	Basic Mathematics	338-340	information & exercises
6,7,8,9	"	340	"
1,2,4,5	Mathematics, A Basic Course	346-349	"
6,7,8	"	366	"
1 to 9	General Mathematics	287-289	"

After you have written Item Progress Check VIII B, Form 1, and have met the criterion, go on to the next Item as indicated on your Diagnosis. If you do not meet the criterion, select additional work from the above table and, after completing it, write Item Progress Check VIII B, Form 2. If you now meet the criterion, go on to the next Item shown on your Diagnosis. If not, see your instructor.

If you have now completed all the work in Unit VIII, you are ready to write Unit VIII Progress Test, Form 1. If you meet the criterion you have completed Unit VIII and may select an additional Math. option if you wish. If you do not meet the criterion on the Unit Progress Test, see your instructor.

Mathematics Item Progress Check

UNIT VIII: PERIMETER, AREA, VOLUME Name: _____

ITEM B: PERIMETER AND CIRCUMFERENCE Date: _____

Form 1

Criterion:	13 /14
Score:	___/___

(1) 1. Perimeter is a measure of : (check one)

___ Length ___ area ___ weight

(1) 2. Perimeter could be measured in: (check one)

___ pounds ___ inches ___ square feet

(1) 3. The perimeter of a figure is the _____

_____

(1) 4. Measure the perimeter of this page. _____

(2) 5. Calculate the perimeter of a square which is 4 in. on each side. Show your work.

Formula: _____

Perimeter: _____

(2) 6. Calculate the perimeter of a rectangle which is 8 meters by 3 meters. Show your work.

Formula: _____

Perimeter: _____

(1) 7. To find the perimeter of a circle we find the length of its _____.

(1) 8. A constant called pi (π) for all circles is approximately $3\frac{1}{7}$ and is a value found by dividing the _____ of a circle by its _____.

(2) 9. Find the circumference of a circle of diameter $3\frac{1}{2}$ in. Show your work. Use $\frac{22}{7}$ for π

Formula: _____

(Circumference) Perimeter: _____

Problem: In the space below, show the work you do to solve problems. One mark is for your work and one mark is for the correct answer.

(2) 10. If picture framing is $2.50 per foot, what does it cost to frame a 3 foot by 4 ft. picture?

_____

Mathematics Item Progress Check

UNIT VIII: PERIMETER, AREA, VOLUME Name: _____

ITEM B : PERIMETER AND CIRCUMFERENCE Date: _____

Form 2

Criterion:	12 / 14
Score:	___/___

(1) 1. Perimeter is a measure of: (check one)

___ area ___ space ___ length

(1) 2. Perimeter could be measured in: (check one)

___ miles ___ sq. ft. ___ cubic feet

(1) 3. When we find the perimeter of a figure we find _____

_____

(1) 4. Measure the perimeter of a dollar bill. _____ in.

(2) 5. Calculate the perimeter of a square which is 12 in. on each side. Show your work.

Formula: _____

Perimeter: _____

(2) 6. Calculate the perimeter of a rectangle which is 8 in. long and 6 in. wide. Show your work.

Formula: _____

Perimeter: _____

(1) 7. The perimeter of a circle is the length of its _____.

(1) 8. If you divide the circumference of a circle by its diameter, you get a number called _____ which is about $3\frac{1}{7}$.

(2) 9. What is the circumference of a circle of radius 7 cm.? Show your work. Use $\frac{22}{7}$ for π

Formula: _____

Circumference: _____

Problem: In the space below, show the work you do to solve problems. Oen mark is for your work and one mark is for the correct answer.

(2) 10. What will it cost to fence a 60 m. by 110 m. lot at 60 cents per meter?

_____

UNIT VIII: PERIMETER, AREA, VOLUME

ITEM C: AREA

OBJECTIVES

The student must be able to:

1. Identify area as the measurement of the surface of a figure and state units used. (sq. in., sq. ft., sq. yd., sq. mi., sq. mm., sq. cm., sq. m.)
2. Define squaring a number by using an example such as 3 squared means 3 x 3 and square given numbers.
3. Use exponential notation for writing squares (a^2).
4. Calculate the area of a given square using the formula $A = s^2$.
5. Define square root by using an example such as square root of 9 means 3 because 3 x 3 = 9 and write square roots of perfect squares to 144.
6. Find the length of the side of a square given the area and the formula $A = s^2$. (Area of a perfect square not greater than 144.
7. Find the area of a given rectangle using the formula A = lw.
8. Identify the base and height in a given triangle.
9. Calculate the area of a given triangle using the formula $A = \frac{1}{2} bh$.
10. Calculate the area of a given circle using the formula $A = \pi r^2$.
11. Solve practical problems involving area calculations of squares, rectangles, triangles and circles, including conversion from one unit to another (for example, 9 square feet = 1 square yard).

LEARNING RESOURCES

Books: Basic Mathematics, Bouman and Lindsay

Refresher Mathematics, Stein

Mathematics, A Basic Course, Cambridge Book Company

General Mathematics, Ginn and Company

LEARNING ACTIVITIES

If you missed any of objectives 1, 2, 3, 4, 6 or 7 on the Diagnosis, get a copy of General Mathematics and read about the "meaning of area" on page 299 and 300. Then read pages 300 to 303. Do the following exercises: page 303, questions 5 and 7; page 304 questions 9, 12, 13, 16 and 18. Check your answers with those in the back of the book.

If you missed either objective 2 or 5 on the Diagnosis, read about "square root" on pages 116 to the middle of page 117. If you are interested, notice the table on page 470 and an explanation of how to use the table on page 121. Do exercise 1 on page 118 and check your answer by multiplying your answer (the square root) by itself. The number you get should equal the number given in the question. Do question 3 and check your answers in the back of the book.

If you missed either objective 8 or 9 on the Diagnosis, read about the "area of a triangle" on page 305. Then do the following exercises on page 306: 1, 3, 5, 6, 7 and 8 a. Check your answers with those in the back of the book.

If you missed objective 10 on the Diagnosis, read about the "area of a circle" on page 312 and do the following exercises on page 313: 1, 3, 5, 6, 7 and 9. Check your answers.

If you missed objective 11 on the Diagnosis, do the following problems: page 303 question 8; page 304 question 15, 17, 19 and 21; page 307 question 15; page 313 question 10 and 14. Check your answers with those in the back of the book.

If your work is correct to this stage, you are ready to write Item Progress Check VIII C, Form 1. If you need further assistance, use one or more of the following:

Objective	Source Materials	Page(s)	Content
1,4,7	Basic Mathematics	341-344	information & exercises
10, 11	"	344-347	"
1	Refresher Mathematics	366-368	"
7	"	371,372	"
4	"	372,373	"
9	"	374	"
2,3	"	256, 257	"
10	"	375, 376	"
11	"	263, 257	problems
		370, 372-374	"
10	Mathematics, A Basic Course	367	information & exercises
4,7,9	"	356-362	"
2,3,5	"	351-354	"

After you have written Item Progress Check VIII C, Form 1, and have met the criterion, go on to the next Item as indicated on your Diagnosis. If you do not meet the criterion, select additional work from the above table and, after completing it, write Item Progress Check VIII C, Form 2. If you now meet the criterion, go on to the next Item shown on your Diagnosis. If not, see your instructor.

If you have now completed all the work in Unit VIII, you are ready to write Unit VIII Progress Test, Form 1. If you meet the criterion you have completed Unit VIII and may select an additional Math. option if you wish. If you do not meet the criterion on the Unit Progress Test, see your instructor.

Mathematics Item Progress Check

UNIT VIII: PERIMETER, AREA, VOLUME Name: _____

ITEM C: AREA Date: _____

Form 1

Criterion:	18/19
Score:	___/___

(1) 1. Area is a measure of: (check one)

___ length ___ surface ___ space

(1) 2. Area could be measured in: (check one)

___ feet ___ cubic feet ___ square feet

(1) 3. 5^2 means _____

(3) 4. Square these numbers.

a. 3 _____ b. 7 _____ c. 6 _____

(2) 5. What is the area of a square which is 4 in. on each side?

Formula: _____ Area: _____

(2) 6. What is the square root of each of these numbers?

a. $\sqrt{16}$ = _____ b. $\sqrt{81}$ = _____

(1) 7. How long is the side of a square of area 64 sq. in.?

_____

(2) 8. What is the area of this page? Show your work.

Formula: _____ Area: _____

(2) 9. What is the area of a triangle which is 2 m. in height and has a base of 3 m.? Show your work.

Formula: _____ Area: _____

(2) 10. What is the area of a circle which is 14 centimeters in diameter? Show your work. Use $\frac{22}{7}$ for π

Formula: _____ Area: _____

Problem: In the space below, show the work you do to solve problems. One mark is for your work and one mark is for the correct answer.

(2) 11. What will it cost to put new floor tile on a room 8 ft. by 15 feet if the tile costs 45 cents per square foot?

_____

Mathematics Item Progress Check

UNIT VIII: PERIMETER, AREA, VOLUME Name: _____

ITEM C: AREA Date: _____

Form 2

Criterion:	17/ 19
Score:	___/___

(1) 1. Area is a measure of: (check one)

___ weight ___ length ___ space ___ surface

(1) 2. Area could be measured in: (check one)

___ square inches ___ cubic inches ___ inches

(1) 3. a^2 means _____

(3) 4. Find the value of each of these.

a. 8^2 _____ b. 11^2 _____ c. 6^2 _____

(2) 5. What is the area of a square which is 3 m. on each side?

Formula: _____ Area: _____

(2) 6. What is the square root of each of these?

a. $\sqrt{36}$ = _____ b. $\sqrt{144}$ = _____

(1) 7. What is the side of a square of area 100 sq. in.?

_____

_____

(2) 8. Find the area of a dollar bill. Show your work.

Formula: _____ Area: _____

(2) 9. What is the area of a triangle which has a base of 15 feet and a height of 10 feet? Show your work.

Formula: _____ Area: _____

(2) 10. Find the area of a circle which has a radius of 14 centimeters. Show your work. Use $\frac{22}{7}$ for π

Formula: _____ Area: _____

Problems: In the space below, show the work you do to solve problems. One mark is for your work and one mark is for the correct answer.

(2) 11. At $10.00 per sq. yd., what will it cost to carpet a room which is 12 feet by 12 feet?

_____

MATHEMATICS

UNIT VIII: PERIMETER, AREA, VOLUME

ITEM D: VOLUME

OBJECTIVES

The student must be able to:

1. Identify cubes, rectangular solids, cylinders, and spheres as forms.
2. Define volume as a measure of space enclosed by the given form and state units used. (cu. in., cu. ft., cu. yd., cu. mm., cu. cm., cu. m.)
3. Calculate the volume of a given rectangular solid (including cubes) using the formula V = lwh.
4. Calculate the volume of a given cylinder using the formula $V = \pi r^2 h$.
5. Solve practical problems involving volume calculations of rectangular solids and cylinder, including conversion from one unit to another (for example, 27 cubic feet = a cubic yard).

LEARNING RESOURCES

Books: Basic Mathematics, Bouman and Lindsay

Refresher Mathematics, Stein

Mathematics, A Basic Course, Cambridge Book Company

General Mathematics, Ginn and Company

LEARNING ACTIVITIES

If you missed objective 1 on the Diagnosis, get a copy of Mathematics, A Basic Course, and read about "geometric solids" on pages 368 to 370. Then do exercises 1 and 2 on page 370. Check your answers with those in the separate answer key.

If you missed objective 2 on the Diagnosis, get a copy of General Mathematics, and read page 316 and the top half of page 317.

If you missed objective 3 on the Diagnosis, read about "Volume of a rectangular solid" on page 317 and look over examples 1 and 2 on page 318. Then do exercise 11-1, questions 4 a, c, d, e and g; 5 a, c and 12 on page 319. Check your answers with those in the back of the book.

If you missed objective 4 on the Diagnosis, read about "Volume of a cylinder" on page 323 and do exercise 11-3, questions 1 a, c and g. Then on page 324 do question 5. Check your answers.

If you missed objective 5 on the Diagnosis, do the following problems: page 319 question 8, 11 and 12; page 324 question 3 and 10. Check your answers.

If your work is correct to this stage, you are ready to write Item Progress Check VIII D, Form 1. If you need further assistance, use one or more of the following:

Objective	Source Materials	Page(s)	Content
1,2,3	Basic Mathematics	347-349	information & exercises
3	Refresher Mathematics	385-387	"
4	"	387,388	"
5	"	386-388	problems
1,2,3,4	Mathematics, A Basic Course	371-374	information & exercises

After you have written Item Progress Check VIII D, Form 1, and have met the criterion, go on to the next Item as indicated on your Diagnosis. If you do not meet the criterion, select additional work from the above table and, after completing it, write Item Progress Check VIII D, Form 2. If you now meet the criterion, go on to the next Item shown on your Diagnosis. If not, see your instructor.

If you have now completed all the work in Unit VIII, you are ready to write Unit VIII Progress Test, Form 1. If you meet the criterion you have completed Unit VIII and may select an additional Math. Option if you wish. If you do not meet the criterion on the Unit Progress Test, see your instructor.

Mathematics Item Progress Check

UNIT VIII: PERIMETER, AREA, VOLUME Name: _____

ITEM D: VOLUME Date: _____

Form 1

Criterion:	10/11
Score:	___/___

(1) 1. Check the words below which are names of forms.

___ cube ___ foot ___ triangle ___ cylinder

(1) 2. Volume is a measure of _____

_____

(3) 3. State three units used in measuring volume.

_____ _____ _____

(2) 4. Find the volume of a box which is 4 in. by 5 in. by 3 in. Show your work.

Formula: _____

Volume: _____

In the space below, show the work you do to solve problems. One mark is for your work and one mark is for the correct answer.

(2) 5. Find the volume of a cylinder which has a diameter of 14 centimeters and a height of 15 centimeters. Use $\frac{22}{7}$ for π

(2) 6. How many cubic yards of concrete are required for a driveway which is 36 ft. long, 12 ft. wide and 4 inches thick?

564

Mathematics Item Progress Check

UNIT VIII: PERIMETER, AREA, VOLUME Name: _____

ITEM D: VOLUME Date: _____

Form 2

Criterion:	9 /11
Score:	___/___

(1) 1. Check the words below which are names of forms.

___ circle ___ rectangular solid ___ square ___ sphere

(1) 2. Volume is _____

_____

(3) 3. State 3 units used in measuring volume.

_____ _____ _____

(2) 4. Find the volume of a rectangular tank which is 6 meters long, 3 meters wide and 2 meters deep. Show your work.

Formula: _____

Volume: _____

(2) 5. Find the volume of a cylinder which is 10 inches high and has a diameter of 6 inches. Show your work.
Use $\frac{22}{7}$ for π

Formula: _____

Volume: _____

Problem: In the space below, show the work you do to solve problems. One mark is for your work and one mark is for the correct answer.

(2) 6. How many gallons of water are in a swimming pool 20 ft. long, 10 ft. wide and 6 ft. deep if each cubic foot contains $6\frac{1}{4}$ gallons?

_____

MATHEMATICS

UNIT VIII: PERIMETER, AREA, VOLUME

ITEM E: PROBLEM SOLVING

OBJECTIVES

The student must be able to:

1. Apply the steps in solving a problem - that is -

   a. Write what is to be found.

   b. Write a word sentence using given facts and telling what is to be found, including what operations are to be used.

   c. Write a number sentence in symbols using given facts and telling what is to be found.

   d. Solve the number sentence (calculate what is not known).

   e. Write the answer to the original problem.

2. Apply each or all of the above in solving a given problem, including conversion from one unit to another (for example, 144 square inches = 1 square foot).

LEARNING RESOURCES

Books: Basic Mathematics, Bouman and Lindsay

Refresher Mathematics, Stein

Mathematics, A Basic Course, Cambridge Book Company

General Mathematics, Ginn and Company

LEARNING ACTIVITIES

If you have missed either objective 1 or 2 on the Diagnosis, review the objectives listed here and get a copy of Refresher Mathematics. Do problems 9 and 1 on page 318, problems 3 and 9 on page 320, and problem 1 on page 371. Check your answers with those in the back of the book. Then do problem 5 on page 372, problem 1 at the top of page 373 and problem 1 on page 374. Check your answers. Finally do problems 3 and 5 on page 376, problem 1 on page 387, and problem 9 on page 388. Check your answers.

If your work is correct to this stage, you are ready to write Item Progress Check VIII E, Form 1. If you need further assistance, use one or more of the following:

Objective	Source Materials	Page(s)	Content
1,2	Basic Mathematics	344,347	problems
1,2	Mathematics, A Basic Course	349, 357	"
		359, 368	"
		372, 373	"
		375	"
1,2	General Mathematics	287-289	"
		303-307	"
		313, 319, 324	" "

After you have written Item Progress Check VIII E, Form 1, and have met the criterion, you are ready to write Unit VIII Progress Test, Form 1. If you meet the criterion on Unit VIII Progress Test, you have completed Unit VIII and may select an additional Math. option if you wish. If you do not meet the criterion on the Unit Progress Test, see your instructor.

If you do not meet the criterion on Item Progress Check VIII E, Form 1, select additional work from the above table and, after completing it, write Item Progress Check VIII E, Form 2.

If you do not meet the criterion, see your instructor.

If you meet the criterion on the Item Progress Check, you are ready to write Unit VIII Progress Test, Form 1. If you meet the criterion on Unit Progress Test VIII, you have completed Unit VIII and may select an additional Math. option if you wish. If you do not meet the criterion on the Unit Progress Test, see your instructor.

Mathematics Item Progress Check

UNIT VIII: PERIMETER, AREA, VOLUME Name: _____

ITEM E: PROBLEM SOLVING Date: _____

Form 1

Criterion:	7 / 8
Score:	___/___

Problems: In the space below, show the work you do to solve problems. One mark is for your work and one mark is for the correct answer.

(2) 1. A field is 67 feet long and 32 feet wide. How much will it cost to fence it, if fencing costs $1.85 a yard?

(2) 2. Some workmen needed to know the diameter of a water main, the ends of which were inaccessible. He found the circumference to be 44 centimeters. What was the diameter?
Use $\frac{22}{7}$ for π

(2) 3. If the area of a rectangle is 3,612 square feet, and its width is 12 feet, what is its length?

(2) 4. What is the volume in cubic centimeters of the metal in the base of a machine if the length is 27 cm., the width is 15 cm. and the thickness is 4 cm.?

Mathematics Item Progress Check

UNIT VIII: PERIMETER, AREA, VOLUME Name: _____

ITEM E: PROBLEM SOLVING Date: _____

Form 2

Criterion:	7 / 8
Score:	___/___

Problems: In the space below, show the work you do to solve problems. One mark is for your work and one mark is for the correct answer.

(2) 1. The perimeter of a triangle is 120 meters. If two of the sides are 30 meters and 40 meters, find the length of the third side of the triangle.

(2) 2. Find the circumference of a truck tire which has a radius of 21 inches. Use $\frac{22}{7}$ for π

(2) 3. Find the number of square yards of carpeting required to cover a floor 9 feet wide and 12 feet long.

(2) 4. Find the volume of a tool box if the area of its base is 2 ¼ square meters and its height is 1½ meters.

Mathematics Unit Progress Test

UNIT VIII: PERIMETER, AREA, VOLUME Name: _____

Form 1 Date: _____

Criterion:	28/ 31
Score:	___/___

(2) 1. a. Give an example of a figure. _____

b. Give an example of a form. _____

(8) 2. Label these.

a._____ b._____ c._____ d._____

e._____ f._____ g._____ h._____

(1) 3. Draw a rectangle of length 2 in. and width $\frac{3}{4}$ in. (Use a ruler and a set square.)

(1) 4. Draw a circle of diameter $3\frac{1}{2}$ centimeters.

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(1) 5. What is the perimeter of this figure?

_____ inches

Problems: In the space below, show the work you do to solve problems. One mark is for your work and one mark is for the correct answer.

(2) 6. Calculate the area of a circle which has a diameter of 28 inches. Use $\frac{22}{7}$ for π

(2) 7. What is the area of a square which is 3 cm. on each side?

(2) 8. What is the perimeter of a rectangle 6 m. wide and 8m. long?

(2) 9. What is the circumference of a circle with a diameter of 28 in.? Use $\frac{22}{7}$ for π

(2) 10. What is the volume of a rectangular solid of width 8 in., length 10 in. and height 4 in.?

(2) 11. What will it cost to put new floor tile on a room which is 9 ft. by 12 ft., if the tiles are 9 inches square and cost 24 cents each?

(2) 12. How long is the baseboard in the 9 ft. by 12 ft. room if one wall has a 3 ft. door?

(2) 13. What is the area of a triangle with a base of 18 cm. a height of 10 cm.?

(2) 14. If 11 cu. ft. of water is put into a cylindrical tank of 1 foot radius, how deep (in feet) will the water be in the tank? Use $\frac{22}{7}$ for π

Mathematics Unit Progress Test

UNIT VIII: PERIMETER, AREA, VOLUME Name: _____

Form 2 Date: _____

Criterion: 23 / 26
Score: ___/___

(1) 1. Is this a diagram of a figure or of a form?

_____

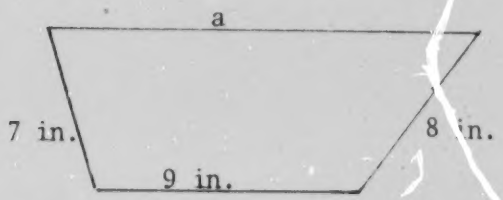
(4) 2. Label these.

a. _____ b. _____ c. _____ d. _____

(1) 3. Draw a rectangle 2 centimeters wide and $3\frac{1}{2}$ centimeters long.

(1) 4. Draw a circle 1 inch in diameter.

(1) 5. The perimeter of the figure is 36". How long is side "a"?



_____

(2) 6. In any circle if you divide the length of the circumference by the diameter a number which we call _____ is the quotient. The value of this number is approximately _____.

Problems: In the space below, show the work you do to solve problems. One mark is for your work and one mark is for the correct answer.

(2) 7. A square has an area of 81 sq. cm. What is the length of each side?

(2) 8. A rectangle has a perimeter of 12 in. If it is 4 inches long, how wide is it?

(2) 9. What is the circumference of a circle which is 7 meters in diameter? Use $\frac{22}{7}$ for π

(2) 10. What is the volume of a cylinder which is 14 inches in diameter and 32 inches high? Use $\frac{22}{7}$ for π

(2) 11. How many square yards of carpet are needed for a floor of a room which is 12 ft. by 15 ft.?

(2) 12. Calculate the area of a circle which has a diameter of 42 inches. Use $\frac{22}{7}$ for π

(2) 13. Calculate the area of a triangle which has a base of 14 centimeters and a height of 5 centimeters.

(2) 14. Calculate the volume of a box which is 12 ft. long, 8 ft wide, and 2½ ft. deep.

Mathematics Diagnosis

UNIT IX: STATISTICS

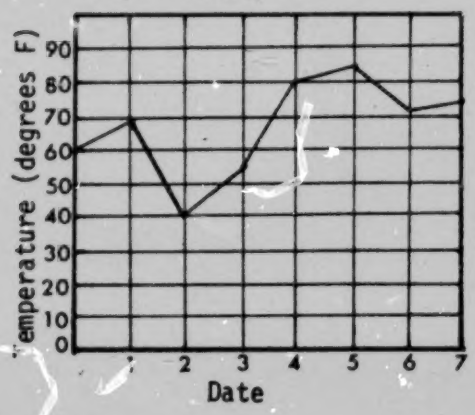
Name: _____

Date: _____

1. Find the average of the following numbers: 62, 43, 88, 94, 76, 57. Show your work. A-1

2. Employees in a company had the following annual wages: $4,200, $6,800, $5,900, $9,700, $3,800, $5,700. What is the average salary of these people to the nearest dollar? Show your work. A-2 E-1 E-2

3. Look at this graph B-1 B-2



a. What kind of graph is this? _____

b. What two things are being shown here? _____

c. What was the temperature on the 3rd? _____

d. How much cooler was it on the 2nd than it was on the 4th? _____

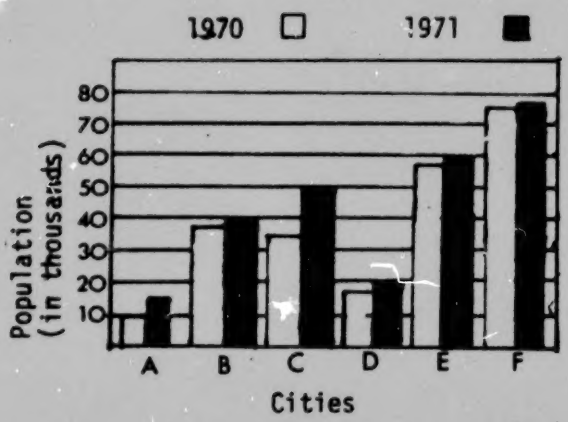
OBJECTIVE

4. Construct a graph of the same kind as in question 3 to show a student who kept track of her typing speed each Friday for a month and had these results.

1st Friday	24 words per minute
2nd Friday	28 words per minute
3rd Friday	36 words per minute
4th Friday	40 words per minute

B-3
E-1
E-2

5. Look at this graph.



C-1
C-2

a. What kind of graph is it?

_____

b. Which city grew the most in 1971?

_____

c. Which city grew the least in 1971?

_____

d. Which city has the largest population?

_____

e. Which city was 3 times as big as city D on Dec. 31/71?

_____

OBJECTIVE

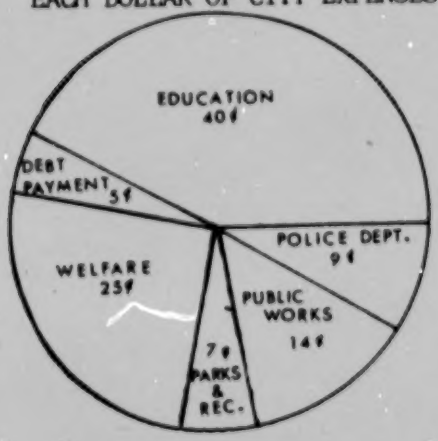
6. Construct a graph of the kind in question 5 to show the following: — C-3, E-1, E-2

Snowfall Records

	1970	1971
Jan.	6 in.	8 in.
Feb.	4 in.	9 in.
Mar.	12 in.	3 in.

7. Look at this graph. — D-1, D-2

EACH DOLLAR OF CITY EXPENSES



a. What kind of graph is it?

_____

b. Which item cost the most?

_____

c. Which item cost the least?

_____

d. Which item cost about twice as much as Parks and Recreation?

_____

	OBJECTIVE
8. Construct a graph like the one in question 7 to show a breakdown of how each dollar of this family's income is spent. Housing, $180 (30%); Food, $150 (25%); Clothing, $60 (10%); Transportation, $60 (10%); Medical and Insurance, $30 (5%); Entertainment, $30 (5%); Furniture Payment, $60 (10%); Savings, $30 (5%).	D-3 E-1 E-2

MATHEMATICS

UNIT IX: STATISTICS

ITEM A: AVERAGE

OBJECTIVES

The student must be able to:

1. Calculate the simple average for a given group of numbers.
2. Use calculations of average in solving word problems.

LEARNING RESOURCES

Books: Learning to Compute, Harcourt, Brace and World, Inc.
Refresher Mathematics, Stein
Mathematics, A Basic Course, Cambridge Book Company

LEARNING ACTIVITIES

If you missed objective 1 or 2 on the Diagnosis, get a copy of Mathematics, A Basic Course, and read about Averages on page 20. Study the example on page 20 and do the following exercises on the top of page 21: question 1, 2, 3, 5 and 6. Check your answers with those in the separate answer key. If you had difficulty, do some more questions from page 21.

If your work is correct to this stage, you are ready to write Item Progress Check IX A, Form 1. If you need further assistance, use one or more of the following:

Objective	Source Materials	Page(s)	Content
1,2	Learning to Compute	29	Information & exercises
1	Refresher Mathematics	526, 527	"
2	"	62, 63	Problems

After you have written Item Progress Check IX A, Form 1, and have met the criterion, go on to the next Item as indicated on your Diagnosis. If you do not meet the criterion, select additional work from the above table and, after completing it, write Item Progress Check IX A, Form 2. If you now meet the criterion, go on to the next Item shown on your Diagnosis. If not, see your instructor.

If you have now completed all the work in Unit IX, you are ready to write Unit IX Progress Test, Form 1. If you meet the criterion, you have completed Unit IX and may select an additional math option if you wish.

If you do not meet the criterion on the Unit Progress Test, see your instructor.

MATHEMATICS ITEM PROGRESS CHECK

UNIT IX: STATISTICS
ITEM A: AVERAGE

Name: _____
Date: _____

Form 1

Criterion:	5 / 6
Score:	___ / ___

(1) 1. Find the average of these numbers;
221, 13, 755, 47, 109, 315, 213, 415

(1) 2. The following marks were achieved on a test. What is the average mark?
123, 101, 85, 172, 121, 49, 189

Problems: In the space below, show the work you do to solve problems. One mark is for your work and one mark is for the correct answer.

(2) 3. A car travelled 301 miles in 7 hours. What was the car's average speed?

(2) 4. If your monthly earnings for 6 months were $575.15, $613.10, $597.25, $550.00, $648.30 and $616.20, calculate your average monthly earnings.

MATHEMATICS ITEM PROGRESS CHECK

UNIT IX: STATISTICS Name _____

ITEM A: AVERAGE Date _____

Form 2

Criterion: 5 / 6

Score: ___/ ___

(1) 1. The following marks were achieved on a test. What is the average mark?
15, 73, 84, 31, 27

(1) 2. Find the average of these numbers:
$5,200, $4,800, $6,500, $8,700

Problems: In the space below, show the work you do to solve problems. One mark is for your work and one mark is for the correct answer.

(2) 3. If your weekly earnings for a month were $115.10, $98.50, $165.40, and $136.00, calculate your average weekly earnings to the nearest dollar.

(2) 4. A plane travelled 2570 miles in 5 hours. What was the plane's average speed?

MATHEMATICS

UNIT IX: STATISTICS

ITEM B: LINE GRAPHS

OBJECTIVES

The student must be able to:

1. Identify a line graph by name.
2. Read specified information from a given line graph.
3. Construct a line graph from given information.

LEARNING RESOURCES

Books: Refresher Mathematics, Stein
Mathematics, A Basic Course, Cambridge Book Company

Aids: Ruler

LEARNING ACTIVITIES

If you missed any of objectives 1, 2 or 3 on the Diagnosis, get a copy of Mathematics, A Basic Course and read about "line graphs" on pages 245 to 247. Then do question 1 on page 247 and questions 4 and 5 on pages 248 and 249. Check your answers with those in the separate answer key and get another student or your instructor to check over your graphs.

If your work is correct to this stage, you are ready to write Item Progress Check IX B, Form 1. If you need further assistance, do some problems from pages 247 and 248. Also look over the information and exercises in the book Refresher Mathematics on page 524.

After you have written Item Progress Check IX B, Form 1, and have met the criterion, go on to the next Item as indicated on your Diagnosis. If you do not meet the criterion, select additional work from that mentioned in the above paragraph and, after completing it, write Item Progress Check IX B, Form 2. If you now meet the criterion, go on to the next Item shown on your Diagnosis. If not, see your instructor.

If you have now completed all the work in Unit IX, you are ready to write Unit IX Progress Test, Form 1. If you meet the criterion, you have completed Unit IX and may select an additional math option if you wish. If you do not meet the criterion on the Unit Progress Test, see your instructor.

MATHEMATICS ITEM PROGRESS CHECK

UNIT IX: STATISTICS

ITEM B: LINE GRAPHS

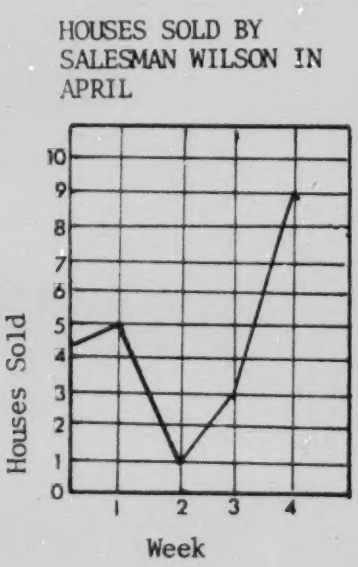
Form 1

Name: _____

Date: _____

Criterion:	12 / 13
Score:	___ / ___

(8) 1. Given the graph:



(1) a. What kind of graph is it?

_____

(1) b. What is the title of the graph?

_____

(2) c. What two main things are being related?

_____

_____

(1) d. Which week had the biggest sales increase?

_____

(1) e. Which week did sales drop?

_____

(1) f. How many sales were there in Week 2?

_____

(1) g. How much did sales increase in Week 3?

(5) 2. Draw a line graph of the following data. Class enrollments for first three months of 1972:

Jan. 125 students
Feb. 150 students
Mar. 100 students

(2 marks for drawing the two scales, and one mark for plotting each point)

MATHEMATICS ITEM PROGRESS CHECK

UNIT IX: STATISTICS

ITEM B: LINE GRAPHS

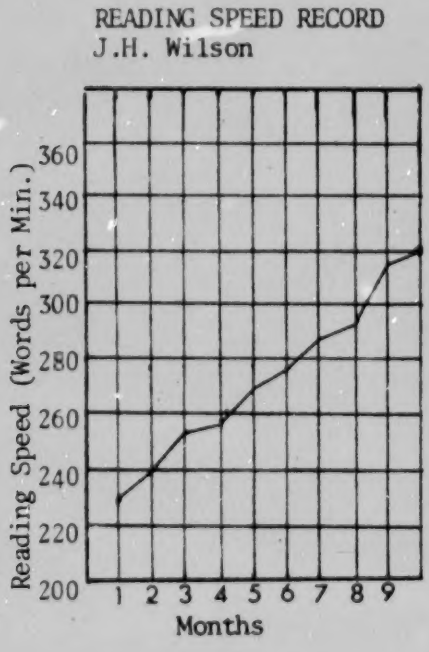
Form 2

Name: _____

Date: _____

Criterion:	15 / 17
Score :	___ / ___

(8) 1. Given the graph:



(1) a. What kind of graph is this?

_____

(1) b. What is the title of the graph?

_____

(2) c. What two main things are related?

_____

_____

(1) d. What was Mr. Wilson's reading speed when he started?

_____

(1) e. What was his reading speed when he finished?

_____

(1) f. How much did he gain during the course?

_____

(1) g. Which month did he gain the most?

_____

(9) 2. Draw a line graph of the following data:
Temperatures at noon during a week in July, 1970
Sunday, 70'; Monday, 83'; Tuesday, 92';
Wednesday, 86'; Thursday, 88'; Friday, 68';
Saturday, 64'.
(2 marks for drawing the two scales, and 1 mark for plotting each point)

MATHEMATICS ITEM PROGRESS CHECK

UNIT IX: STATISTICS

ITEM C: BAR GRAPHS

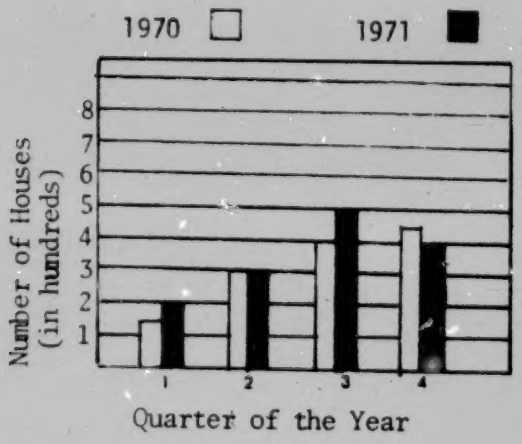
Form 1

Name: _____

Date: _____

Criterion: 14 / 15
Score: ___ / ___

(7) 1. Given this graph:



(1) a. What kind of graph is this? _____

(2) b. What are the two main things being related?

_____

_____

(1) c. Which quarter of the year had the most new houses in 1970?

_____

(1) d. How many more new houses were constructed in the 1st quarter of 1971 than in the same quarter of 1970?

_____

(1) e. How many new houses were constructed in all of 1971?

_____

(1) f. Which quarter had about the same number of houses constructed in both years?

_____

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(8) 2. Construct a bar graph to show this data.
XY Company's sales in July, August and September of 1971 and 1972 if the sales were:

Month	1971	1972
July	40	35
August	60	65
September	30	40

(2 marks for drawing the scales and one mark for drawing each bar)

MATHEMATICS

UNIT IX: STATISTICS

ITEM C: BAR GRAPHS

OBJECTIVES

The student must be able to:

1. Identify a bar graph by name.
2. Read specified information from a given bar graph.
3. Construct a bar graph from given information.

LEARNING RESOURCES

Books: Learning to compute, Harcourt, Brace and World, Inc.
Refresher Mathematics, Stein
Mathematics, A Basic Course, Cambridge Book Company

Aids: Ruler

LEARNING ACTIVITIES

If you missed any of objectives 1, 2 or 3 on the Diagnosis, get a copy of Mathematics, A Basic Course and read about "Bar Graphs" on pages 241 to 244. Then do questions 1 and 2 in the exercises on the bottom of page 244. Check your answers with another student or your instructor.

If your work is correct to this stage, you are ready to write Item Progress Check IX C, Form 1. If you need further assistance, use one or more of the following:

Objective	Source Materials	Page (s)	Content
1,2,3	Refresher Mathematics	523	Information and exercises
2	Learning to Compute	99	Exercises

After you have written Item Progress Check IX C, Form 1, and have met the criterion, go on to the next Item as indicated on your Diagnosis. If you do not meet the criterion, select additional work from the above table and, after completing it, write Item Progress Check IX C, Form 2. If you now meet the criterion, go on to the next Item shown on your Diagnosis. If not, see your instructor.

If you have now completed all the work in Unit IX, you are ready to write Unit IX Progress Test, Form 1. If you meet the criterion, you have completed Unit IX and may select an additional math option if you wish. If you do not meet the criterion on the Unit Progress Test, see your instructor.

MATHEMATICS ITEM PROGRESS CHECK

UNIT IX: STATISTICS Name: _____

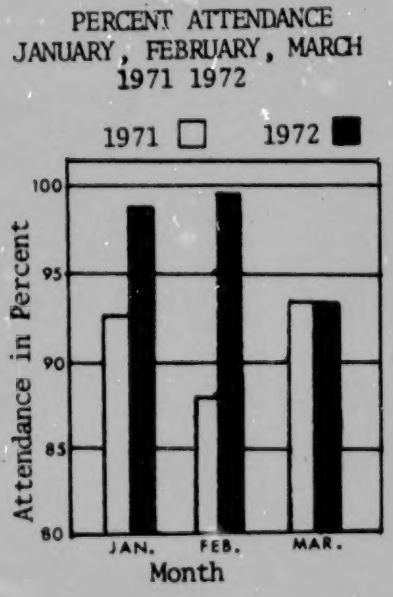
ITEM C: BAR GRAPHS Date: _____

Form 2

Criterion: 13 / 15

Score: ___ / ___

(7) 1. Given this graph:



(1) a. What kind of graph is this? _____

(2) b. What are the two main things being related?

_____

_____

(1) c. Which month and year had the best attendance?

_____

(1) d. Which month was the attendance the same in both years?

_____

(1) e. Would you say that the attendance was better in 1971 than 1972?

_____

(1) f. In which month of which year do you think there was a lot of sickness?

_____

(8) 2. Construct a bar graph to show this data. Cost of heating a house for December, January and February of 1970 and 1971.

Month	1970	1971
December	$23	$18
January	$32	$42
February	$28	$36

(2 marks for drawing the scales and one mark for drawing each bar)

MATHEMATICS

UNIT IX: STATISTICS

ITEM D: CIRCLE GRAPHS

OBJECTIVES

The student must be able to:

1. Identify a circle graph by name.
2. Read specified information from a given circle graph.
3. Construct a circle graph from given information.

LEARNING RESOURCES

Books: Refresher Mathematics, Stein
Mathematics, A Basic Course, Cambridge Book Company

Aids: Ruler and compass

LEARNING ACTIVITIES

If you missed any of objectives 1, 2 or 3 on the Diagnosis, get a copy of Mathematics, A Basic Course and read about "Circle Graphs" on pages 249 to 251. Then do questions 1 and 2 in the exercises on the bottom of page 251. Check your answers with another student or your instructor.

If your work is correct to this stage, you are ready to write Item Progress Check IX D, Form 1. If you need further assistance, look over the information and exercises shown in the book Refresher Mathematics, on page 525.

After you have written Item Progress Check IX D, Form 1, and have met the criterion, go on to the next Item as indicated on your Diagnosis. If you do not meet the criterion, select additional work from that mentioned in the above paragraph and, after completing it, write Item Progress Check IX D, Form 2. If you now meet the criterion, go on to the next Item shown on your Diagnosis. If not, see your instructor.

If you have now completed all the work in Unit IX, you are ready to write Unit IX Progress Test, Form 1. If you meet the criterion, you have completed Unit IX and may select an additional math option if you wish. If you do not meet the criterion on the Unit Progress Test, see your instructor.

MATHEMATICS ITEM PROGRESS CHECK

UNIT IX: STATISTICS

ITEM D: CIRCLE GRAPHS

Name: _____

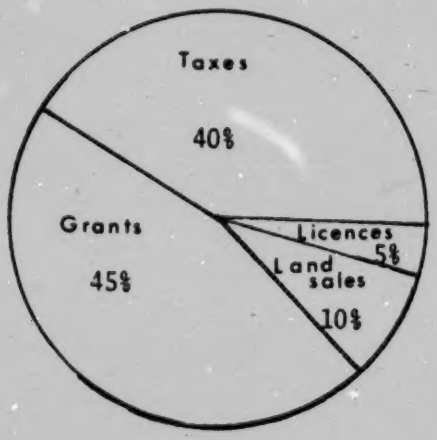
Date: _____

Form 1

Criterion:	10 / 11
Score:	___ / ___

(4) 1. Given this graph:

CITY INCOME



a. What kind of graph is this? _____

b. What is the biggest source of income for the city?

_____

c. The value of government grants is equal to the total of _____ and _____

d. If the city's revenue is $2,000,000 what amount comes from government grants?

_____

(7) 2. Construct a circle graph of the following data.

FAMILY EXPENSES

Food, 25%; Rent, 25%; Transportation, 10%; Insurance and Medical, 5%; payments on Debts, 20%; Savings, 10%; Miscellaneous, 5%.

(1 mark for each section correctly located in the circle graph)

MATHEMATICS ITEM PROGRESS CHECK

UNIT IX: STATISTICS

ITEM D: CIRCLE GRAPHS

Form 2

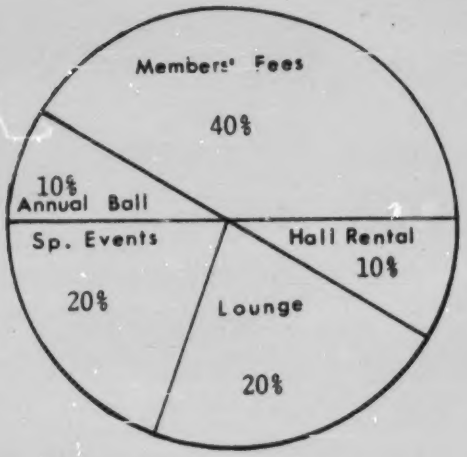
Name: _____

Date: _____

Criterion:	7 / 8
Score:	___ / ___

(4) 1. Given this graph:

1972 CLUB INCOME



a. What kind of graph is this? _____

b. What is the biggest source of income for the club?

_____

c. If the club needs a total of $12,000 for the year, how much must it earn through special events?

_____

d. What two sources of income together are equal to the amount of special events?

_____

(4) 2. Construct a circle graph showing the following data:

Time Spent on Subjects
Mathematics, 40%; Reading, 20%; Language, 25%;
Other subjects, 15%.

(1 mark for each section correctly located in the circle graph)

MATHEMATICS

UNIT IX: STATISTICS

ITEM E: PROBLEM SOLVING

OBJECTIVES

The student must be able to:

1. Apply the steps in solving a problem - that is -
   a. Write what is to be found.
   b. Write a word sentence using given facts and telling what is to be found, including what operations are to be used.
   c. Write a number sentence in symbols using given facts and telling what is to be found.
   d. Solve the number sentence. (calculate what is not known)
   e. Write the answer to the original problem.
2. Apply each or all of the above in solving a given problem.

LEARNING RESOURCES

Books: Refresher Mathematics, Stein
Mathematics, A Basic Course, Cambridge Book Company

LEARNING ACTIVITIES

If you have missed either objective 1 or 2 on the Diagnosis, review the objectives listed here and get a copy of Refresher Mathematics. Do problems 3 and 5 in "Averages" on page 62 and problem 9 on page 63. Also answer questions 1 and 3 at the top of pages 523, 524, and 525. Check your answers with those in the back of the book. Then do "practice problems" question 1 on pages 523, 524, and 525. Check your answers with a fellow student or your instructor.

If your work is correct to this stage, you are ready to write Item Progress Check IX E, Form 1. If you need further

assistance, use one or more of the following:

Objective	Source Materials	Page (s)	Content
1,2	Mathematics, A Basic Course	21	problems - averages
1,2	"	247	problems - line graphs
1,2	"	244	problems - bar graphs
1,2	"	251	problems - circle graphs

After you have written Item Progress Check IX E, Form 1, and have met the criterion, you are ready to write Unit IX Progress Test, Form 1. If you meet the criterion on Unit IX Progress Test, you have completed Unit IX and may select an additional math option if you wish. If you do not meet the criterion on the Unit Progress Test, see your instructor.

If you do not meet the criterion on Item Progress Check IX E, Form 1, select additional work from the above table and, after completing it, write Item Progress Check IX E, Form 2. If you do not meet the criterion, see your instructor.

If you meet the criterion on the Item Progress Check, you are ready to write Unit IX Progress Test, Form 1. If you meet the criterion on Unit Progress Test IX you have completed Unit IX and may select an additional math option if you wish. If you do not meet the criterion on the Unit Progress Test, see your instructor.

MATHEMATICS ITEM PROGRESS CHECK

UNIT IX: STATISTICS Name: _____

ITEM E: PROBLEM SOLVING Date: _____

Form 1

Criterion:	16 / 17
Score:	____ / ____

(15) 1. Sketch the following information neatly in the form of a bar graph, a line graph, and a circle graph. Draw the three graphs on a separate sheet or sheets of paper and attach to this sheet. 5 marks for each graph.

A farmer had the following animals:

23 cows
2 bulls
25 heifers
50 steers

Problem: In the space below, show the work you do to solve the problem. One mark is for your work and one mark is for the correct answer.

(2) 2. Mrs. Jones travelled 453 miles one day, 238 miles on the second day, and 359 miles on the third day. What average distance did she travel per day?

MATHEMATICS ITEM PROGRESS CHECK

UNIT IX: STATISTICS Name: _____

ITEM E: PROBLEM SOLVING Date: _____

Form 2

Criterion:	16 / 17
Score:	___ / ___

(15) 1. Sketch the following information neatly in the form of a bar graph, a line graph and a circle graph. Draw the three graphs on a separate sheet or sheets of paper and attach to this sheet. 5 marks for each graph.

During a federal election the following were elected:

Progressive Conservatives	120
Liberals	90
N.D.P.	34
Social Credit	20

Problem: In the space below, show the work you do to solve problems. One mark is for your work and one mark is for the correct answer.

(2) 2. Mr. Cliff ran a furniture moving company. The first load he moved weighed 4,322 lbs., the second load weighed 2,897 lbs., and the last weighed 5,540 lbs. What was the average weight per load?

MATHEMATICS UNIT PROGRESS TEST

UNIT IX: STATISTICS

Name: _____

Form 1

Date: _____

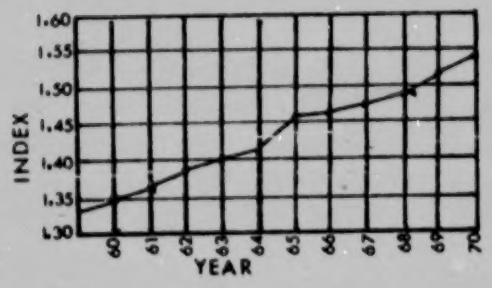
Criterion: 13 / 15

Score: ___ / ___

(1) 1. Calculate the average of these numbers.
5,200, 5,600, 7,650, 4,360, 5,475

_____

(3) 2. Look at this graph.

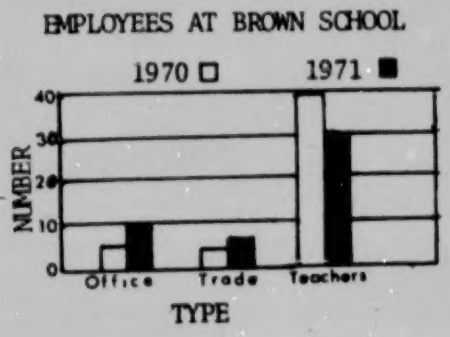


a. What kind of graph is it? _____

b. What was the cost of living index in 1960?
_____

c. How much did the cost of living change from 1960 to 1970?
_____

(3) 3. Look at this graph.

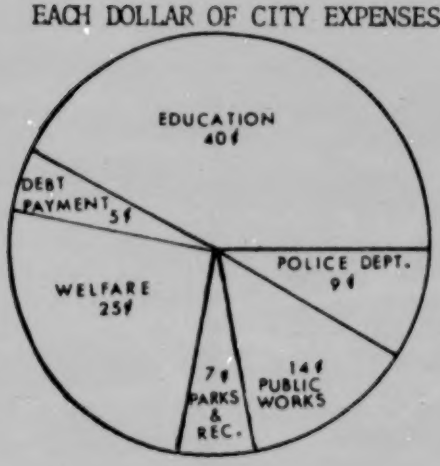


a. What kind of graph is this? _____

b. How many more office workers were employed in '71 than '70?
_____

c. Which occupation had the biggest gain in 1971? _____

(3) 4. Look at this graph.



a. What kind of graph is it? _____

b. What percent of the tax dollar is spent on education? _____

c. How many cents of each dollar are spent on welfare services? _____

(5) 5. Draw a graph to represent the following data. Choose the type of graph which you think will show the data most clearly. (one-half mark for each item on the graph)

NEW BUSINESSES OPENED 1970 and 1971

TYPE OF BUSINESS	1970	1971
Barber Shops	5	7
Dept. Stores	2	1
Grocery Stores	4	6
Service Stations	1	8
Restaurants	4	4

MATHEMATICS UNIT PROGRESS TEST

UNIT IX: STATISTICS

Name: _____

Form 2

Date: _____

Criterion: 14 / 16

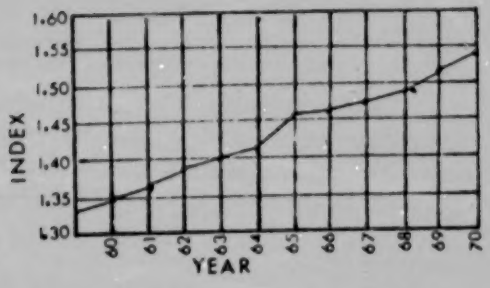
Score: ____ / ____

(1) 1. Calculate the average of these numbers.
68, 42, 75, 78, 93, 81, 63, 12.

_____

(3) 2. Look at this graph.

COST OF LIVING INDEX 1960-70



a. What kind of graph is it?

_____

b. How much did the cost of living change for 1968-1970?

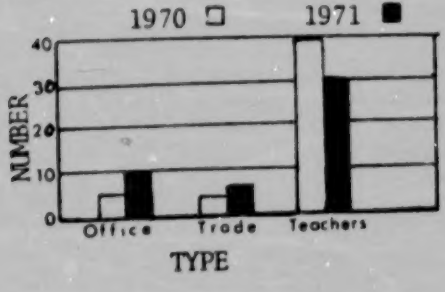
_____

c. What was the cost of living index in 1969?

_____

(3) 3. Look at this graph.

EMPLOYEES AT BROWN SCHOOL



a. What kind of graph is it? _____

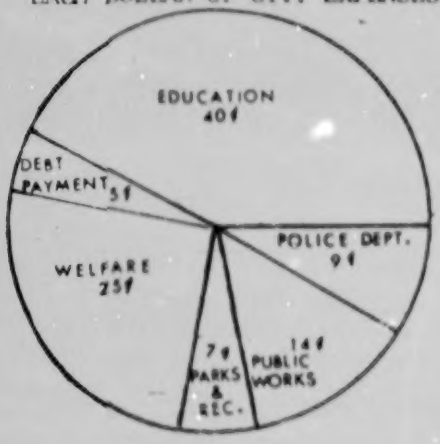
b. Which occupation is decreasing in numbers of employed?

_____

c. How many teachers were employed in 1970?

_____

(3) 4. Look at this graph.



a. What kind of graph is this? _____

b. What is the service which costs the most?

_____

c. What percent of the tax dollar is spent on debt payments?

_____

(6) 5. Draw a graph to represent the following data. Choose the type of graph which you think will show the data most clearly. (1 mark for each item on the graph)

ELEMENTARY SCHOOL ENROLLMENTS: 1965 - 1970

1965 - 450
1966 - 460
1967 - 510
1968 - 640
1969 - 630
1970 - 580

Mathematics Diagnosis

UNIT X: GEOMETRY

NAME: _____

DATE: _____

1. Match the figure on the left with a name on the right by writing the letter of the figure in the space.

OBJECTIVE A-1

a. _____

b.

c.

d.

e. _____

_____ vertical line

_____ horizontal line

_____ oblique line

_____ straight line

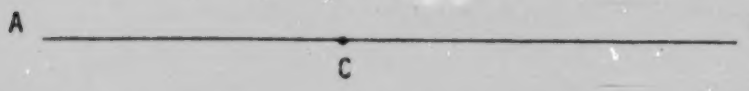
_____ parallel lines

2. Draw a line 3 ¼ inches long and label it line AB. A-2, A-3

3. Bisect the line AB below using a straight edge and compass. A-4

A _____ B

4. Construct a perpendicular line to the line AB at the point C. Use a straight edge and compass.



OBJECTIVE A-5

5. Check the one which is an angle.

a. ___
b. ___
c. ___

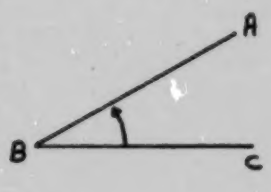
B-1

6. We measure angles in units which are each $\frac{1}{360}$ of a full turn or circle. These units are called _____

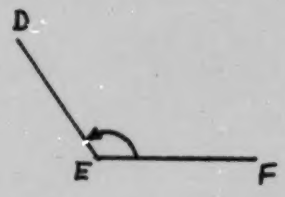
B-2

7. Name these angles. (∠ means angle)

B-3



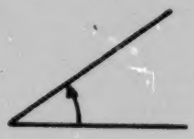
a. ∠ _____



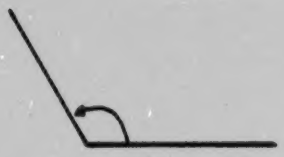
b. ∠ _____

OBJECTIVE

8. Measure these angles and write their size in the space.

a.  _____°

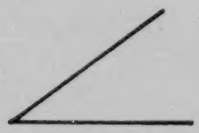
B-4

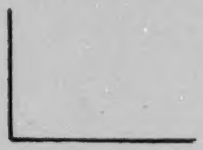
b.  _____°

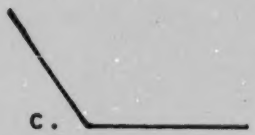
9. Draw an angle of 30° with a protractor and a straight edge.

B-5

10. Label each angle below by the name which tells its kind.

a.  _____

b.  _____

c.  _____

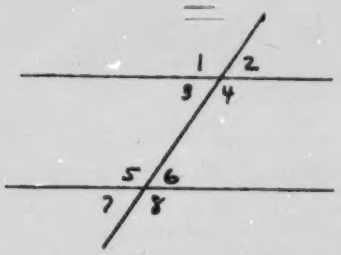
B-6

11. Angles which are supplementary have a total of _____ degrees, while complementary angles total _____.

B-7

OBJECTIVE

12. Given the diagram below, which angle is:



a. interior _____

b. exterior _____

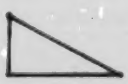
c. alternate to $\angle 4$ _____

d. corresponding to $\angle 6$ _____

B-8

13. Match the figures on the left with the names on the right by writing the letter of the figure in the space.

C-1

a.  _____ scalene triangle

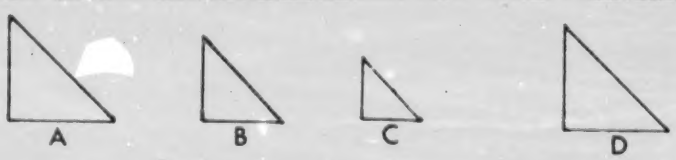
b. _____ right triangle

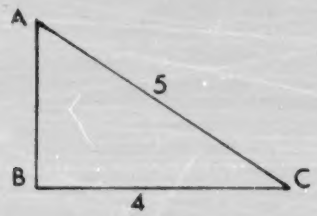
c. _____ isosceles triangle

d. _____ equilateral triangle

14. Draw a triangle ABC which has side BC = 2 in., side AB = 1 in., and side AC = $1\frac{3}{4}$ in. Use a straight edge and compass.

C-2, C-3

	OBJECTIVE
15. Draw a $\triangle$ DEF with side DE = 1 inch, $\angle$DEF = 30^{0} and side EF = $1\frac{1}{2}$ inches. Use a straight edge, compass and protractor.	C-2, C-3
16. Define "congruent figures". _____	C-4
17. Define "similar figures". _____	C-5
18. Which pair of triangles in the diagram below is congruent and which pair is similar?  _____ is congruent to _____ _____ is similar to _____	C-6
19. Show the right angle in the triangle with an "X" and the hypotenuse with a "Y".	C-7

	OBJECTIVE
20. Given the following right triangle ABC, calculate the length of the side AB. Use the Pythagorean Theorem and show your work. 	C-8 E-1, E-2
21. Is the scale drawing of a house similar or congruent to the actual house? _____	D-1
22. Name two examples of scale drawings in common use. _____ _____	D-2
23. A blue print of a house is drawn to scale of $\frac{1}{4}$ inch = 1 foot. If a wall is $1\frac{1}{4}$ inch long in the blue print, how long will the actual wall be? Show your work. _____	D-3 E-1, E-2

24. A flag pole is 24 feet high. Draw a vertical line to represent the flag pole to scale $\frac{1}{8}$ inch = 1 foot. Show your work.

D-4
E-1, E-2

UNIT X: Geometry

ITEM A: Lines

OBJECTIVES

The student must be able to:

1. Identify straight lines, horizontal lines, vertical lines, parallel lines and oblique lines from a series of diagrams.
2. Draw a line segment of given length.
3. Label a line segment. (A B)
4. Bisect a given line using a straight edge and compass.
5. Construct a perpendicular to a given line segment at a given point using a straight edge and compass.

LEARNING RESOURCES

Books: Basic Mathematics, Bouman and Lindsay

Refresner Mathematics, Stein

General Mathematics, Ginn and Company

Mathematics, A Basic Course, Cambridge Book Company

Aids : Straight edge and compass.

LEARNING ACTIVITIES

If you missed objective 1 or 3 on the Diagnosis get a copy of Mathematics, A Basic Course and read pages 319 and 320. Do exercises 1 to 5 on page 322 and have another student or your instructor check your work.

If you missed objective 2 on the Diagnosis, read page 321. Try constructing some lines yourself.

If you missed objective 4 on the Diagnosis, read about "bisecting a line" at the bottom of page 321 and on page 322. Draw some lines and try bisecting them. Have another student or your instructor check your work.

If you missed objective 5 on the Diagnosis, read about "constructing right angles and perpendicular lines" on pages 322 to the top of page 334. After looking over problems 1, 2, and 3 on these pages, try drawing one of each type for yourself. Have another student or your instructor check your work.

If you work is correct to this stage, you are ready to write Item Progress Check X A, Form 1. If you need further assistance, use one or more of the following:

OBJECTIVE	SOURCE MATERIALS	PAGE (S)	CONTENT
1, 2, 3	Basic Mathematics	298-301	Information and Exercises
4, 5	"	307-309	"
1, 2, 3	Refresher Mathematics	305-307	"
2	"	309	"
4, 5	"	346-348	"
1, 2, 3	General Mathematics	194, 196, 197	"
2, 3, 4	"	198-200	"
5	"	211	"

After you have written Item Progress Check X A, Form 1, and have met the criterion, go on to the next Item as indicated on your Diagnosis. If you do not meet the criterion, select additional work from the above table and, after completing it, write Item Progress Check X A, Form 2. If you now meet the criterion go on to the next Item shown on your Diagnosis. If not, see your instructor.

If you have completed all the work in Unit X, you are ready to write Unit X Progress Test, Form 1. If you meet the criterion, you have completed Unit X and may select an additional math option if you wish. If you do not meet the criterion on the Unit Progress Test, see your instructor.

Mathematics Item Progress Check

UNIT X: Geometry Name: _____

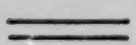
ITEM A: Lines Date: _____

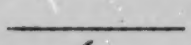
Form 1

Criterion: 7 / 7
Score : __ / __

(4) 1. Match the figures with the names.

a. _____ oblique line

b.  _____ horizontal line

c.  _____ vertical line

d. _____ parallel lines

(1) 2. Draw a line segment $2\frac{1}{4}$ inches long and label it AB.

(1) 3. Bisect this line segment (use a straight edge and compass; show all your construction lines).

(1) 4. Draw a perpendicular to the line XY below at the point Z.
(Use a compass and straight edge; show all construction lines.)

Mathematics Item Progress Check

UNIT X: Geometry Name: _____

ITEM A: Lines Date: _____

Form 2

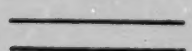
Criterion: 7 / 7
Score : __/__

(4) 1. Match the figures with the names.

a. _____ oblique line

b. _____ parallel lines

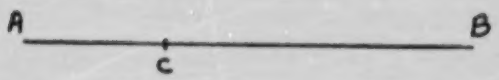
c. _____ horizontal line

d.  _____ vertical line

(1) 2. Draw a line segment XY, 3 $\frac{1}{8}$ inches long and label it AB.

(1) 3. Bisect the line below (use straight edge and compass and show all construction lines).

(1) 4. Draw a perpendicular to the line AB below at the point C. (Use straight edge and compass and show all construction lines.)



MATHEMATICS

UNIT X: GEOMETRY

ITEM B: ANGLES

OBJECTIVES

The student must be able to:

1. Identify an angle in a series of diagrams.
2. Identify a degree as a measure of angles and as being $\frac{1}{360}$ of a circle.
3. Label angles and identify angles by letter name.
4. Measure given angles in degrees using a protractor.
5. Draw angles of given size using a protractor and straight edge.
6. Label acute, right, obtuse, reflex and straight angles.
7. Define supplementary and complementary angles.
8. Identify interior, exterior, alternate and corresponding angles in a diagram of parallel lines cut by a transversal.

LEARNING RESOURCES

Books: Basic Mathematics, Bouman and Lindsay
Refresher Mathematics, Stein
General Mathematics, Ginn and Company
Mathematics, A Basic Course, Cambridge Book Company

Aids: Straight edge, compass, and protractor.

LEARNING ACTIVITIES

If you missed any of objectives 1, 2, 3, 6, or 7 on the Diagnosis, get a copy of Mathematics, A Basic course and read pages 323 to 325. Then do exercises 1 to 6 on page 325, exercises 7,13 a-f on page 326, and exercise 19 a-d on page 327. Check your answers with those in the separate answer key.

If you missed either objective 4 or 5 on the Diagnosis, read about "measuring and constructing angles with a protractor on pages 327 to 329. Then do exercise 1 on page 329 and exercises 2 and 3 a-f on page 330. Have another student or your instructor check your work.

If you missed objective 8 on the Diagnosis, get a copy of General Mathematics and read about "parallel lines" on pages 251 and 252. Then do exercise 2 and 4 on page 252. Check your answers with another student or your instructor.

If your work is correct to this stage, you are ready to write Item Progress Check X B, Form 1. If you need further assistance, use one or more of the following:

Objective	Source Materials	page(s)	content
2, 3	Basic Mathematics	303	Information
4, 5	"	305 - 307	Information & exercises
1, 3, 6	Refresher Mathematics	338, 339	"
2, 4, 5	"	340, 341	"
1, 2, 3,	General Mathematics	203, 204	"
4, 5,	"	204-207	"
6, 7	"	208, 209	"

After you have written Item Progress Check $\bar{X}$ B, Form 1, and have met the criterion, go on to the next Item as indicated on your Diagnosis. If you do not meet the criterion, select additional work from the above table and, after completing it, write Item Progress Check $\bar{X}$ B, Form 2. If you now meet the criterion, go on to the next Item shown on your Diagnosis. If not, see your instructor.

If you have now completed all the work in Unit $\bar{X}$, you are ready to write Unit $\bar{X}$ Progress Test, Form 1. If you meet the criterion, you have completed Unit $\bar{X}$ and may select an additional math option if you wish. If you do not meet the criterion on the Unit Progress Test, see your instructor.

Mathematics Item Progress Check

UNIT X : GEOMETRY Name: _____

ITEM B : ANGLES Date: _____

Form 1

Criterion:	15 / 16
Score:	___ / ___

(1) 1. Check the figure below which is an angle.

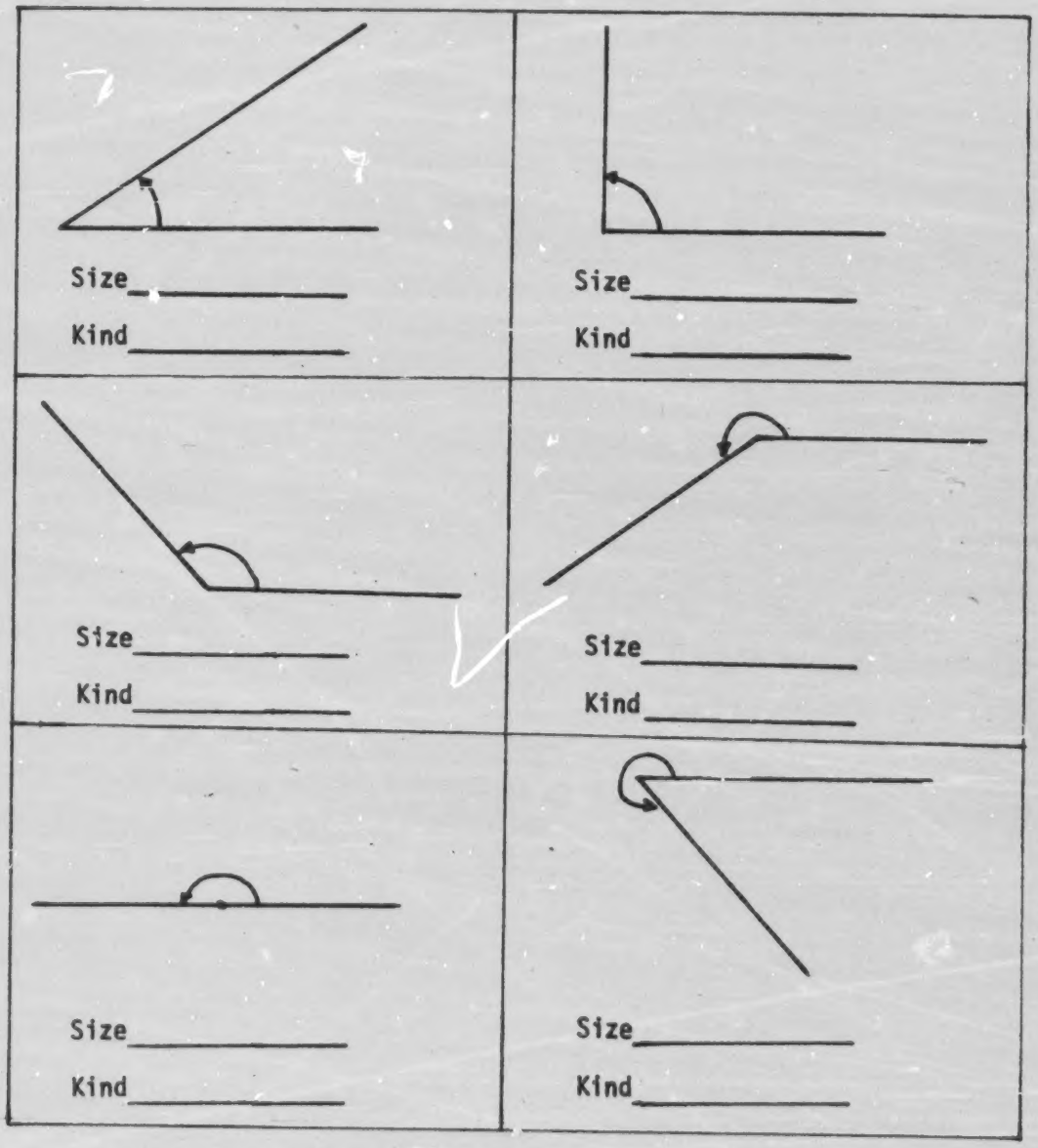
a. b. c. d.

_____ _____ _____ _____

(2) 2. Angles are measured in _____. Each of these units is _____ of a circle or of a complete turn about a point.

(1) 3. Draw an angle ABC which is 65^{o} .

(10) 4. Measure these angles and label them as being acute, right, obtuse, reflex or straight angles.



Size_____
Kind_____

Size_____
Kind_____

Size_____
Kind_____

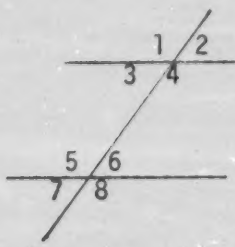
Size_____
Kind_____

Size_____
Kind_____

Size_____
Kind_____

(1) 5. If $\angle A + \angle B = 90^{\circ}$, then $\angle A$ and $\angle B$ are _____ angles.

(1) 6.



In this diagram the interior angles are _____.

Mathematics Item Progress Check

UNIT X : GEOMETRY Name: _____

ITEM B : ANGLES Date: _____

Form 2

Criterion: 12 / 13
Score: ___/ ___

(1) 1. Draw an example of an angle.

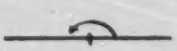
(2) 2. Degrees are the units to measure _____. One degree is _____ of a full turn around a point.

(1) 3. Measure this angle.

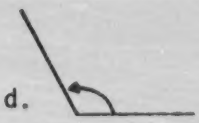
_____ o

(5) 4. What kind of angles are these?

a. _____

b.  _____

c. _____

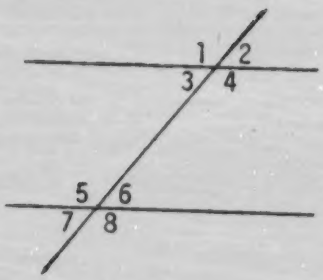
d.  _____

e. _____

(1) 5. Draw an angle ABC of 130^{o}.

(1) 6. If $\angle A + \angle B = 180^{o}$, then $\angle A$ and $\angle B$ are _____ angles

(2) 7.



In this diagram,

a. $\angle 4$ is alternate to $\angle$ ____

b. $\angle 4$ corresponds to $\angle$ ____

MATHEMATICS

UNIT X: GEOMETRY

ITEM C: TRIANGLES

OBJECTIVES

The student must be able to:

1. Identify scalene, right, equilateral and isosceles triangles from diagrams and descriptions.

2. Label triangles and identify triangles by letter name.

3. Draw triangles with protractor, ruler and compass given the measure of:

    1. 3 sides;
    2. 2 sides and the included angle;
    3. 2 angles and an included side.

4. Define congruent figures as figures which are the same shape and size.

5. Define similar figures as figures which have the same shape but are different in size.

6. Identify congruent and similar triangles from diagrams on which lengths of sides are shown.

7. Label right angle and hypotenuse in a given right triangle.

8. Apply the Pythagorean theorem to find an unknown side of a right triangle.

LEARNING RESOURCES

Books: Basic Mathematics, Bouman and Lindsay

Refresher Mathematics, Stein

General Mathematics, Ginn and Company

Mathematics, A Basic Course, Cambridge Book Company

LEARNING ACTIVITIES

If you missed either objective 1 or 2 on the Diagnosis, get a copy of Mathematics, A Basic Course and read from the bottom half of page 336 to page 338. Then do the exercises on "plane figures" on page 338. Check your answers with those in the separate answer key.

If you missed objective 3 on the Diagnosis, read about constructing triangles on pages 338 to 340. Then do exercises 1 to 6 and 7 (a and b) on page 340 and exercises 9 (a-d), 10 (a-d), 11 and 12 on page 341. Check your answers with the separate answer key and where no answers are given, with another student or your instructor.

If you missed any of objectives 4, 5 or 6 on the Diagnosis, read pages 385 to 386 and do question 4 on page 387. Check your answer with another student or your instructor. Then read about "congruent triangles" on pages 393 to 395. Then do exercises 1 and 4 on page 395. Check your answers with the separate answer key.

If you missed either objective 7 or 8 on the Diagnosis, read about "perimeter of a right triangle" from the bottom of page 349 to page 355. Use the table to find square roots or use the calculation method if you wish. You already know the easy ones: 1x1=1, 2x2=4, 3x3=9, to 12x12=144. Then do exercise 2a and 3 on page 356. Check your answers with the separate answer key.

If your work is correct to this stage, you are ready to write Item Progress Check X C, Form 1. If you need further assistance, use one or more of the following:

Objective	Source Materials	page(s)	content
1,3	Basic Mathematics	311-315	information & exercises
1	Refresher Mathematics	313,314	information
2,7,8	"	321-323	information & exercises
2,4,5,6	"	324,325	"
3	"	344,345	"
1,2	General Mathematics	233,235	information
3,4,5	"	237-243	information & exercises

After you have written Item Progress Check $\overline{X}$ C, Form 1, and have met the criterion, go on to the next Item as indicated on your Diagnosis. If you do not meet the criterion, select additional work from the above table and, after completing it, write Item Progress Check $\overline{X}$ C, Form 2. If you now meet the criterion, go on to the next Item shown on your Diagnosis. If not, see your instructor.

If you have now completed all the work in Unit $\overline{X}$, you are ready to write Unit $\overline{X}$ Progress Test, Form 1. If you meet the criterion, you have completed Unit $\overline{X}$ and may select an additional math option if you wish. If you do not meet the criterion on the Unit Progress Test, see your instructor.

Mathematics Item Progress Check

UNIT X: Geometry Name: _____

ITEM C: Triangles Date: _____

Form 1

Criterion: 12/13
Score : __/__

(4) 1. What kind of triangles are these?

(a) has 2 sided equal _____

(b) has 3 sided equal _____

(c) has no sides equal _____

(d) has a right angle _____

(1) 2. Using a protractor, ruler and compass draw a triangle ABC in that AB =1". $\angle$ ABC = 30^0 and BC = $1\frac{1}{2}$ ".

(2) 3. Congruent figures are figures which are the same

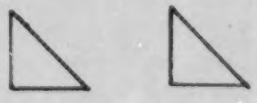
_____ and _____ .

(1) 4. Similar figures are figures which are the _____

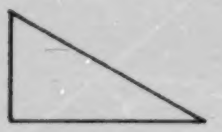
_____ .

(1) 5. Are these two triangles congruent?

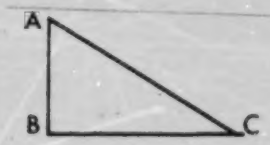
_____



(2) 6. In the right triangle below put an 'x' in the angle which is the right angle and put an 'h' on the hypotenuse.



(2) 7. In the space below, show the work you do to solve the problem. One mark is for your work and one mark is for the correct answer.



If AB=3 and BC=4, calculate the length of AC.

Mathematics Item Progress Check

UNIT X: GEOMETRY

ITEM C: TRIANGLES

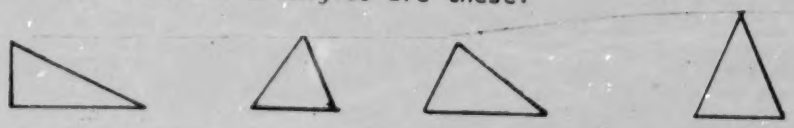
Form 2

Name: _____

Date: _____

Criterion:	9 / 10
Score:	

(4) 1. What kind of triangles are these?



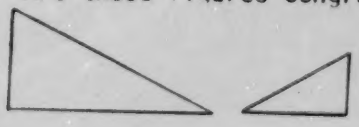
a._____ b._____ c._____ d._____

(1) 2. Using a ruler, protractor and compass, draw a triangle DEF so that DE=1", EF=1½" and DF=1".

(1) 3. Figures with the same shape and size are _____ figures.

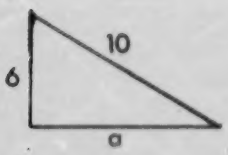
(1) 4. Figures with the same shape but of different size are _____ figures.

(1) 5. Are these figures congruent or are they similar?



_____

(2) 6. In the space below, show the work you do to solve the problem. One mark is for your work and one mark is for the correct answer.



In the right triangle, calculate the length of side a.

_____

MATHEMATICS

UNIT X: GEOMETRY

ITEM D: SCALE

OBJECTIVES

The student must be able to:

1. Identify a scale drawing as being similar to the actual article or figure.
2. Identify examples of scale drawings in common use.
3. Calculate actual lengths given a scale drawing and the scale.
4. Make a scale drawing of a given simple plane figure to a given scale.

LEARNING RESOURCES

Books: Basic Mathematics, Bouman and Lindsay

Refresher Mathematics, Stein

General Mathematics, Ginn and Company

Mathematics, A Basic Course, Cambridge Book Company

LEARNING ACTIVITIES

If you missed any of objectives 1,2,3 or 4 on the Diagnosis, get a copy of Mathematics, A Basic Course and read pages 154 to 155. Then do exercise 1 and 2 (a-d) on page 155 and exercise 3(a-c) and 5a on page 156. Check your answers with the separate answer key. Then read over "Using Scale Drawing" and "Finding the Scale" on pages 156 and 157. Do exercise 1(a-d) on the bottom of page 157 and exercise 2 on page 158. Check your answers with those in the separate answer key.

If your work is correct to this stage, you are ready to write Item Progress Check $\overline{X}$ D, Form 1. If you need further assistance, use one or more of the following:

Objective	Source Materials	page(s)	content
1,2	Basic Mathematics	238, 239	information & exercises
1,2,3	Refresher Mathematics	310, 311	"
1,2	General Mathematics	370-372	"

After you have written Item Progress Check $\overline{X}$ D, Form 1, and have met the criterion, go on to the next item as indicated on your Diagnosis. If you do not meet the criterion, select additional work from the above table and, after completing it, write Item Progress Check $\overline{X}$ D, Form 2. If you now meet the criterion, go on to the next Item shown on your Diagnosis. If not, see your instructor.

If you have now completed all the work in Unit $\overline{X}$, you are ready to write Unit $\overline{X}$ Progress Test, Form 1. If you meet the criterion, you have completed Unit $\overline{X}$ and may select an additional math option if you wish. If you do not meet the criterion on the Unit Progress Test, see your instructor.

Mathematics Item Progress Check

UNIT X: Geometry

ITEM D: Scale

Form 1

Name: _____

Date: _____

Criterion: 8 / 9
Score : __/__

(1) 1. A scale drawing of a figure is _____ to the actual figure.

(2) 2. Give two examples of scale drawings in common use.

1. _____

2. _____

Problems: In the space below, show the work you do to solve problems. One mark is for your work and one mark is for the correct answer.

(2) 3. This is a scale drawing of a flag pole which is drawn to a scale of $\frac{1}{8}$ inch = 1 foot.

How high is the actual flag pole?

_____.

(2) 4. On a map two towers are $1\frac{1}{2}$ inches apart. If the map is drawn to a scale of 1 inch = 12 miles, how far apart are these towers?

_____.

(2) 5. A garage door is 8 feet high and 10 feet wide. It is rectangular in shape. Make a scale drawing of the door to a scale of $\frac{1}{8}$" = 1 foot.

Mathematics Item Progress Check

UNIT X: GEOMETRY Name: _____

ITEM D: SCALE Date: _____

Form 2

Criterion:	8 / 9
Score:	__/__

(1) 1. A scale drawing of an object is _____ to the object.

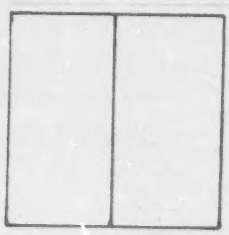
(2) 2. Give two examples of scale drawings we use.

1. _____

2. _____

Problems: In the space below, show the work you do to solve problems. One mark is for your work and one mark is for the correct answer.

(2) 3. This is a scale drawing of a window. How high is the actual window if this drawing is to a scale of ¼" = 1 foot?



_____

(2) 4. This line is a scale drawing of a chain to ¼" = 1 ft. How long is the actual chain?

_____ _____ ft.

(2) 5. Make a scale drawing of a rectangular table top to a scale of ¼" = 1 ft., if the table is 4 ft. long and 6 ft. wide.

MATHEMATICS

UNIT X: GEOMETRY

ITEM E: PROBLEM SOLVING

OBJECTIVES

The student must be able to:

1. Apply the steps in solving a problem - that is -
   a. Write what is to be found.
   b. Write a word sentence using given facts and telling what is to be found, including what operations are to be used.
   c. Write a number sentence in symbols using given facts and telling what is to be found.
   d. Solve the number sentence. (Calculate what is not known).
   e. Write the answer to the original problem.
2. Apply each or all of the above in solving a given problem.

LEARNING RESOURCES

Books: Basic Mathematics, Bouman and Lindsay

Mathematics, A Basic Course, Cambridge Book Company

Refresher Mathematics, Stein

General Mathematics, Ginn and Company

LEARNING ACTIVITIES

If you have missed either objective 1 or 2 on the Diagnosis, review the objectives listed here and get a copy of Refresher Mathematics. Do problems 1 and 5 on page 310 and problem 10 on page 311. The answers to problems 1 and 5 are in the back of the book. Have another student check your answer to problem 10. Then do problems 3 and 5 on page 341, problems 1 (any 3 questions), 3 (any 3 questions) and 9 on page 323. Check your answers. Do problem 1 on page 344 and check your drawing with another student or your instructor.

If your work is correct to this stage, you are ready to write Item Progress Check X E, Form 1. If you need further assistance, use one or more of the following:

OBJECTIVES	SOURCE MATERIALS	PAGE(S)	CONTENT
1, 2	Basic Mathematics	320-322	Problems
1, 2	Mathematics, A Basic Course	156	Problems (scale)
1, 2	"	322	" (lines)
1, 2	"	326, 327	" (angles)
1, 2	"	340	" (triangles)
1, 2	General Mathematics	371, 372	" (scale)
1, 2	"	235, 236, 240, 241, 244	" (triangles)
1, 2	"	204, 207, 209	" (angles)
1, 2	"	195, 197, 200, 211	" (lines)

After you have written Item Progress Check X E, Form 1, and have met the criterion, you are ready to write Unit X Progress test, Form 1. If you meet the criterion on Unit X Progress Test, you have completed Unit X and may select an additional math option if you wish. If you do not meet the criterion on the Unit Progress Test, see your instructor.

If you do not meet the criterion on Item Progress Check X E, Form 1, select additional work from the above table and, after completing it, write Item Progress Check X E, Form 2. If you do not meet the criterion, see your instructor.

If you meet the criterion on the Item Progress Check, you are ready to write Unit X Progress Test, Form 1. If you meet the criterion on Unit Progress Test X you have completed Unit X and may select an additional math option if you wish. If you do not meet the criterion on the Unit Progress Test, see your instructor.

Mathematics Item Progress Check

UNIT X: GEOMETRY Name: _____

ITEM E: PROBLEM SOLVING Date: _____

Form 1

Criterion:	6 / 6
Score:	___/___

Problems: In the space below, snow the work you do to solve problems. One mark is for your work and one mark is for the correct answer.

(2) 1. If you planted 12 trees in a straight line, 18 inches apart, what would be the distance between the 1st and 6th trees?

(2) 2. If a right triangle has one side of length 8 centimeters and a hypotenuse of length 10 centimeters, calculate the length of the remaining side.

(2) 3. The scale used in making the scale drawing of a door is given as 1 inch = 4 feet. If the door in the drawing measures 1 3/4 by 3/4 inches, what are the measurements of the actual door.

Mathematics Item Progress Check

UNIT X: GEOMETRY Name: _____

ITEM E: PROBLEM SOLVING Date: _____

Form 2

Criterion:	5 / 6
Score:	__/__

Problems: In the space below, show the work you do to solve problems. One mark is for your work and one mark is for the correct answer.

(2) 1. A farmer fenced in his yard by placing a post every 10 feet. If the yard was a square 40 feet long and 40 feet wide, how many post holes did he have to dig?

(2) 2. If a right triangle has a hypotenuse of length 5 centimeters, and a side of length 3 centimeters, calculate the length of the remaining side.

(2) 3. If 1/4 inch represents 5 yards, how many inches long must a scale length be to represent a football field 110 yards long?

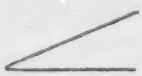
Mathematics Unit Progress Test

UNIT X: GEOMETRY Name: _____

Form 1 Date: _____

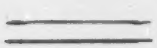
Criterion:	33 / 36
Score:	__/__

(6) 1. Match by writing the letter of the diagram on the left in the correct space on the right.

a.  _____ line segment

b. _____ parallel lines

c. F_____G _____ triangle

d.  _____ vertical line

e. _____ oblique line

f. _____ angle

(1) 2. Bisect this line segment. Use a straight edge and a compass.

X_____Y

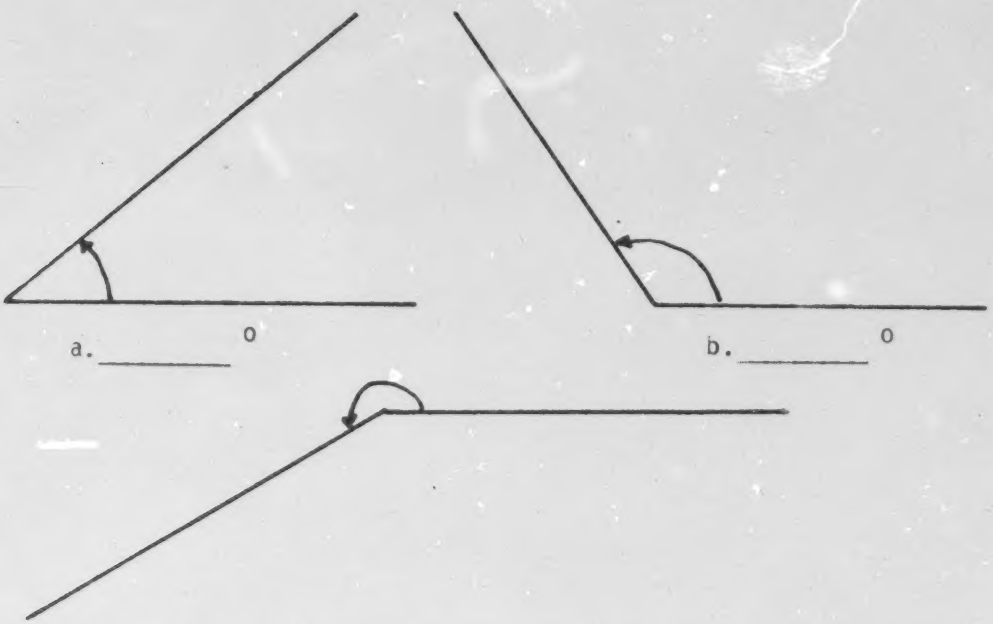
(1) 3. Draw a perpendicular to the line CD at the point E. (Use a compass and straight edge.)

C D
E

(2) 4. a. Angles are measured in _____.

b. A degree is _____ of a full turn about a point.

(3) 5. Measure these angles with a protractor.

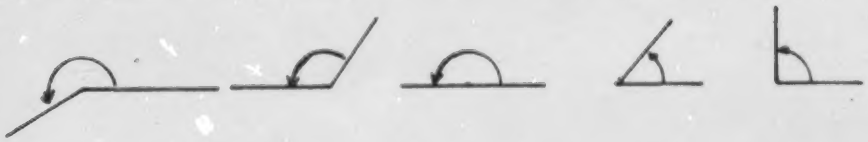


a. _____ o

b. _____ o

c. _____ o

(5) 6. What kind of angles are each of these?

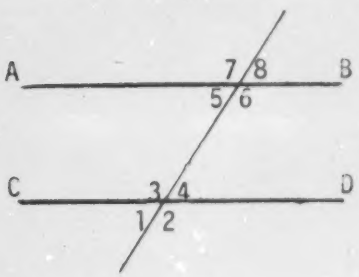


a._____ b._____ c._____ d._____ e._____

(1) 7. How many degrees are in $\angle A$ if $\angle B = 30^{\circ}$ and $\angle A$ and $\angle B$ are complementary?

_____

(4) 8. In this diagram AB and CD are parallel.



The interior angles are _____

The exterior angles are _____

The angle alternate to $\angle 3$ is _____

The angle corresponding to $\angle 6$ is _____

(1) 9. Draw a triangle ABC given that AB = 1", $\angle ABC = 30^{\circ}$ and BC = 3/4".

(1) 10. What are congruent figures? _____

_____

(4) 11. Name the kind of triangle which is described in each.

a. has a right angle _____

b. has two sides equal _____

c. has all sides equal _____

d. has no sides equal _____

(2) 12. What is the length of the hypotenuse of a right triangle in which the other two sides are 8 in. and 6 in.?
Show your work. 1 mark for your work and 1 mark for the correct answer.

_____

(1) 13. A scale drawing is a figure which is _____ to the actual thing?

(2) 14. Name two common examples of scale drawings?

_____

_____

(1) 15. What is the actual distance between the two points A and B on the map which is drawn to a scale of 1" = 50 miles?

_____

(1) 16. A chain is 12 ft. long. Draw a line to represent this chain to a scale of 1/4" = 1 ft.

Mathematics Unit Progress Test

UNIT X: GEOMETRY

Name: _____

Form 2

Date: _____

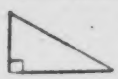
Criterion: 16 / 19
Score: __/__

(5) 1. Name these geometrical structures:

a. _____

b. _____

c. _____

d.  _____

e. _____

(1) 2. Draw a triangle DEF with DE = 1", EF = 1 1/4" and DF = 3/4". Use a straight edge and compass.

(2) 3. A degree is a unit used to measure _____ and it is _____ of a full turn or circle.

(1) 4. Draw an angle of 35^{o} using ruler and protractor.

(2) 5. Draw examples of:

a. acute angle

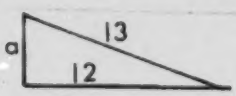
b. reflex angle

(1) 6. What are similar figures? _____

_____

(1) 7. Angles X and Y are supplementary. If $\angle X = 80^{o}$, then $\angle Y$ = _____ o

(2) 8. In this right triangle, find the length of side "a"
Show your work; 1 mark for your work and 1 mark for the correct answer.



a = _____

(1) 9. A doorway on a plan of a house is 3/4 in. wide. How wide is tne actual doorway if the plan is to a scale of 1/4" = 1 ft.?

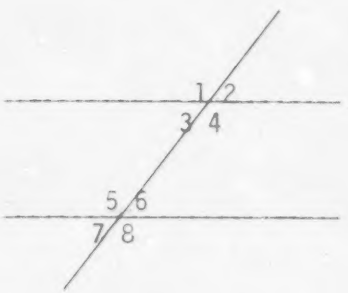
_____

(1) 10. Maps are _____ drawings.

(1) 11. Bisect this line segment. Use a compass and straight edge.

_____

(1) 12. In this diagram which angle is alternate to ∠4?



_____

Mathematics Diagnosis

UNIT XI : INTEGERS AND RATIONALS Name: _____

Date: _____

OBJECTIVE

1. a. Circle the whole numbers in the following list. A-1

$\frac{1}{2}$ 0 2.3 $3\frac{2}{5}$ 4

b. Circle the positive integers in the following list. A-1

2 -4 $\frac{1}{2}$ -2.1 +10

c. Circle the negative integers in the following list. A-1

$-2\frac{1}{2}$ -5 $+1\frac{2}{3}$ -2 2.7

d. Circle the positive and negative rational numbers in the following list. A-1

$\frac{2}{3}$ -2.5 -3 $\frac{1}{2}$ +2 $\frac{-7}{5}$

2. Write in symbols. A-2

a. negative two _____ b. Positive nine _____

3. Write the opposite of each in symbols. A-3

a. three _____ b. negative five _____

4. Arrange these numbers from smallest to largest. A-4

0, -5, +2, 3, -1, $-\frac{1}{2}$

___, ___, ___, ___, ___, ___

OBJECTIVE

5. Add. B-1

a. $5 + (-4) =$ _____ c. $(+7) + (+2) =$ _____

b. $(-6) + 4 =$ _____ d. $(-3) + (-8) =$ _____

6. Add. B-2

a. $(+\frac{1}{3}) + (-\frac{1}{3}) =$ _____ c. $(-3\ \frac{1}{2}) + (-2\ \frac{1}{2}) =$ _____

b. $+2 + (-\frac{1}{2}) =$ _____ d. $(-1.5) + (+2.1) =$ _____

7. Subtract. B-3

a. $(+7) - (+3) =$ _____ c. $(+6) - (-3) =$ _____

b. $(-5) - (-2) =$ _____ d. $(-8) - (+5) =$ _____

8. Subtract. B-4

a. $(+\frac{1}{3}) - (+\frac{1}{3}) =$ _____ c. $(-\frac{1}{6}) - (-\frac{5}{6}) =$ _____

b. $(-3.0) - (+1.5) =$ _____ d. $(+\frac{3}{4}) - (-\frac{1}{2}) =$ _____

9. The temperature changed from 5^0 below zero to 15^0 above zero. How much did it change? (Show your work) B-5, F-1, F-2

_____

10. If your bank account was overdrawn by $15 and you deposited $25, how much would you have in your account? (Show your work) B-5, F-1, F-2

_____

11. Multiply. C-1

a. $(+5) \times (+6) =$ _____ c. $(-8) \times (+3) =$ _____

b. $(+3) \times (-2) =$ _____ d. $(-4) \times)-2) =$ _____

OBJECTIVE

12. Multiply. C-2

a. $(+\frac{1}{2}) \times (+\frac{1}{4}) =$ _____ c. $(-\frac{3}{5}) \times (+\frac{2}{5}) =$ _____

b. $(+\frac{1}{3}) \times (-\frac{1}{3}) =$ _____ d. $(-\frac{3}{8}) \times (-\frac{7}{8}) =$ _____

13. Divide. C-3

a. $(+9) \div (+3) =$ _____ c. $(-12) \div (+4) =$ _____

b. $(+7) \div (-1) =$ _____ d. $(-14) \div (-7) =$ _____

14. Divide. C-4

a. $(+5) \div (+2.5) =$ _____ c. $(+3) \div (-\frac{1}{3}) =$ _____

b. $(-4) \div (+\frac{1}{2}) =$ _____ d. $(-\frac{4}{15}) \div (-\frac{2}{15}) =$ _____

15. If the temperature was -10 degrees and rose 3 degrees in each of 5 hours, what is the new temperature? C-5, F-1, F-2

16. Simplify. (Show your work) D-1

a. $5 + (3-2) =$ _____

b. $(7+4) + 2 =$ _____

OBJECTIVE

16. Simplify. (continued) (Show your work)

c. $5 + \left\{(4+1) + (2+3)\right\} =$ _____

d. $(5+2) - (4+3) =$ _____

17. Simplify. (Show your work) D-2

a. $5(3) \div \frac{2+4}{6} =$ _____

b. $\frac{7+3}{5} \times \frac{7-2}{5} =$ _____

18. State the order of operation rules. D-3

1. _____
2. _____
3. _____

19. Simplify. D-4

a. $5 + 3 \times 2 =$ _____

b. $20 + \frac{20+5}{5} - 8 =$ _____

c. $4 + 9 \div 3 - 2 + 5 =$ _____

d. $(17 \times 0) \div 5 =$ _____

e. $56 - 12 \times (6-4) \div 17 =$ _____

OBJECTIVE

20. Factor these numbers. E-1

a. 9 = _____ c. 48 = _____

b. 12 = _____

21. In the statement 3 X 2 = 6, the factors are _____ E-2

22. A prime number is _____ E-3

_____

23. Factor these numbers to prime factors. E-4

a. 96 _____ b. 144 _____

24. Find the greatest common factor (G.C.F.) of 60 and 45. E-5

_____

25. Find the lowest common multiple (L.C.M.) of 18 and 24. E-6

_____

UNIT XI: INTEGERS AND RATIONALS

ITEM A : DEFINITIONS AND NOTATION

OBJECTIVES

The student must be able to:

1. Define whole numbers, positive integers, negative integers, integers and rational numbers (numbers which can be expressed as fractions).

2. Read and write positive and negative integers and rational numbers correctly.

3. Define the opposite of a number by writing the opposite of a given number using correct + or - signs.

4. Arrange a set of positive and negative numbers from smallest to largest.

LEARNING RESOURCES

Books: Refresher Mathematics, Stein

General Mathematics, Ginn and Company

Mathematics, A Basic Course, Cambridge Book Company

LEARNING ACTIVITIES

If you missed any of objectives 1, 2, 3 or 4 on the Diagnosis, get a copy of Refresher Mathematics and read pages 474 to 476. Then do practice problems 1 and 3 on page 476. Check your answers with those in the back of the book. Read about "opposites" on page 477 and 478 and do practice problems 1 and 3 on page 478. Check your answers.

If your work is correct to this stage, you are ready to write Item Progress Check XI A, Form 1. If you need further assistance, use one or more of the following:

OBJECTIVE	SOURCE MATERIALS	PAGE (S)	CONTENT
1,2,3,4	General Mathematics	86-89	Information and Exercises
1,2,3,4	Mathematics, A Basic Course	299-301	"

After you have written Item Progress Check XI A, Form 1, and have met the criterion, go on to the next Item as indicated on your Diagnosis. If you do not meet the criterion, select additional work from the above table and, after completing it, write Item Progress Check XI A, Form 2. If you now meet the criterion, go on to the next Item shown on your Diagnosis. If not, see your instructor.

If you have now completed all the work in Unit XI, you are ready to write Unit XI Progress Test, Form 1. If you meet the criterion, you have completed Unit XI and may select an additional math option if you wish. If you do not meet the criterion on the Unit Progress Test, see your instructor.

Matnematics Item Progress Check

UNIT XI: INTEGERS AND RATIONALS Name: _____

ITEM A : DEFINITIONS AND NOTATION Date: _____

Form 1

Criterion: 10 / 10
Score : __ / __

(4) 1. a. Circle the whole numbers in the following list.

7.9 8 $4\frac{2}{3}$ 3 $\frac{7}{9}$

b. Circle the positive integers in the following list.

15 $\frac{1}{4}$ 3 -9 $-6\frac{2}{3}$

c. Circle the negative integers in the following list.

-2.3 7 -3 $\frac{2}{7}$ -89

d. Circle the positive and negative rational numbers in the following list.

$\frac{5}{8}$ -4 $-7\frac{1}{2}$ 9.8 $-\frac{5}{9}$

(2) 2. Write these numbers in words.

a. -2 _____

b. $+1\frac{1}{2}$ _____

(2) 3. Write these numbers using symbols.

a. positive four _____

b. negative three and one-half _____

(1) 4. What is the opposite of +3? _____

(1) 5. Arrange these in order from smallest to largest.

0, -5, $2\frac{1}{2}$, $-\frac{3}{4}$, $-\frac{1}{2}$

_____ _____ _____ _____ _____

Mathematics Item Progress Check

UNIT XI: INTEGERS AND RATIONALS Name: _____

ITEM A : DEFINITIONS AND NOTATION Date: _____

Form 2

Criterion: 9 / 10
Score : _ / _

(4) 1. a. Circle the whole numbers in the following list.

$\frac{5}{7}$ 3 6 7.8 $2\frac{1}{4}$

b. Circle the positive integers in the following list.

2.3 $\frac{1}{2}$ 8 $3\frac{1}{3}$ 7

c. Circle the negative integers in the following list.

$-\frac{5}{8}$ -5 -8 2.6 -2.6

d. Circle the positive and negative rational numbers in the following list.

$\frac{2}{5}$ $-\frac{3}{4}$ -7 -2.9 $9\frac{3}{8}$

(2) 2. Write these numbers in words.

a. +5 _____

b. $-\frac{3}{4}$ _____

(2) 3. Write these numbers using symbols.

a. negative seven _____

b. positive thirteen _____

(1) 4. What is the opposite of -5? _____

(1) 5. Arrange these in order from smallest to largest.

$-\frac{3}{4}$, 0, 5, -7, $-\frac{1}{3}$

_____

MATHEMATICS

UNIT XI: INTEGERS AND RATIONALS

ITEM B : ADDITION AND SUBTRACTION

OBJECTIVES

The student must be able to:

1. Calculate sums of positive and negative integers.
2. Calculate sums of positive and negative rational numbers.
3. Calculate differences of positive and negative integers.
4. Calculate differences of positive and negative rational numbers.
5. Use addition and subtraction of integers and rational numbers in solving word problems.

LEARNING RESOURCES

Books: Refresner Mathematics, Stein

General Mathematics, Ginn and Company

Mathematics, A Basic Course, Cambridge Book Company

LEARNING ACTIVITIES

If you missed any of objectives 1, 2 or 5 on the Diagnosis, get a copy of Mathematics, A Basic Course and read about "addition of signed numbers" from page 301 to page 304. Then do exercise 1 (a-p), 2 (a-f), and 3 (a-z) on pages 304 and 305. Check your answers with those in the separate answer key. Then do problems 1, 2, 3 and 4 on the bottom of page 305. Check your answers.

If you missed any of objectives 3, 4 or 5 on the Diagnosis, read pages 306 and 307. Then do exercises 1 to 20 on page 307. Check your answers with the separate answer key. Then do problems 1 and 2 at the bottom of page 307 and top of page 308. Check your answers.

If your work is correct to this stage, you are ready to write Item Progress Check XI B, Form 1. If you need further assistance, use one or more of the following:

OBJECTIVE	SOURCE MATERIALS	PAGE (S)	CONTENT
1	Refresher Mathematics	479-481	Information and Exercises
3	"	481-483	"
1, 5	General Mathematics	91-94	"
3, 5	"	96-98	"
2, 4	"	109-111	"

After you have written Item Progress Check XI B, Form 1, and have met the criterion, go on to the next Item as indicated on your Diagnosis. If you do not meet the criterion, select additional work from the above table and, after completing it, write Item Progress Check XI B, Form 2. If you now meet the criterion, go on to the next Item shown on your Diagnosis. If not, see your instructor.

If you have now completed all the work in Unit XI, you are ready to write Unit XI Progress Test, Form 1. If you meet the criterion, you have completed Unit XI and may select an additional math option if you wish. If you do not meet the criterion on the Unit Progress Test, see your instructor.

Mathematics Item Progress Check

UNIT XI: INTEGERS AND RATIONALS Name: _____

ITEM B : ADDITION AND SUBTRACTION Date: _____

Form 1

Criterion:	23/25
Score :	__/__

(10) 1. Add.

a. $\begin{array}{r} +3 \\ +6 \\ \hline \end{array}$ b. $\begin{array}{r} +17 \\ -2 \\ \hline \end{array}$ c. $\begin{array}{r} -5 \\ +5 \\ \hline \end{array}$ d. $\begin{array}{r} -13 \\ -9 \\ \hline \end{array}$ e. $\begin{array}{r} -9 \\ +6 \\ \hline \end{array}$

f. $(+5) + (-2) =$ _____ i. $(-6\frac{1}{2}) + (2\frac{3}{4}) =$ _____

g. $(-13) + (+13) =$ _____ j. $(+5.25) + (-19.60) =$ _____

h. $(-5) + 0 =$ _____

(10) 2. Subtract.

a. $\begin{array}{r} +13 \\ +15 \\ \hline \end{array}$ b. $\begin{array}{r} -9 \\ +2 \\ \hline \end{array}$ c. $\begin{array}{r} 42 \\ -5 \\ \hline \end{array}$ d. $\begin{array}{r} -9 \\ +9 \\ \hline \end{array}$ e. $\begin{array}{r} -6 \\ -6 \\ \hline \end{array}$

f. $(-8) - (+3) =$ _____

g. $(-5) - (+8) - (+5) =$ _____

h. $15 - 5 =$ _____

i. $(-17) - (-17) =$ _____

j. $(-5.4) - (2.1) =$ _____

(3) 3. Do these.

a. $5 - 3 + 7 =$ _____ c. $20 - 5 + 5 =$ _____

b. $17 - 13 - 4 =$ _____

Problem: In the space below, show the work you do to solve problems. One mark is for your work and one mark is for the correct answer.

(2) 4. If the temperature was -18^{o} and dropped 3^{o}, what would the temperature be?

_____

Mathematics Item Progress Check

UNIT XI: INTEGERS AND RATIONALS Name: _____

ITEM B : ADDITION AND SUBTRACTION Date: _____

Form 2

Criterion: 22/25
Score : __/__

(10) 1. Add.

a. $\begin{array}{r} +5 \\ +2 \\ \hline \end{array}$ b. $\begin{array}{r} -6 \\ -7 \\ \hline \end{array}$ c. $\begin{array}{r} +42 \\ -\ 9 \\ \hline \end{array}$ d. $\begin{array}{r} -19 \\ +\ 6 \\ \hline \end{array}$ e. $\begin{array}{r} -21 \\ +21 \\ \hline \end{array}$

f. $+5 + (+6) - (+6) =$ _____

g. $(-7) + (-2) + (+17) =$ _____

h. $(-14) + (-18) =$ _____

i. $(+3.1) + (-3.1) =$ _____

j. $(-2\ \frac{1}{6}) + (+8\ \frac{2}{3}) =$ _____

(10) 2. Subtract.

a. $\begin{array}{r} +2\ \frac{1}{2} \\ -1\ \frac{1}{4} \\ \hline \end{array}$ b. $\begin{array}{r} -9.5 \\ -2.1 \\ \hline \end{array}$ c. $\begin{array}{r} +17 \\ +\ 5 \\ \hline \end{array}$ d. $\begin{array}{r} -31 \\ +\ 7 \\ \hline \end{array}$ e. $\begin{array}{r} 0 \\ -2 \\ \hline \end{array}$

f. $7 - (-3) =$ _____

g. $(-24) - (19) =$ _____

h. $+16 - (+4) =$ _____

(10) 2. Subtract. (continued)

i. $(+20) - (+2\frac{1}{2}) =$ _____

j. $(-3.6) - (3.6) =$ _____

(3) 3. Do these.

a. $7 + 3 - 11 =$ _____ c. $15 - 5 + 6 =$ _____

b. $14 - 5 - 12 =$ _____

Problem: In the space below, show the work you do to solve problems. One mark is for your work and one mark is for the correct answer.

(2) 4. If the temperature changed from 10° below zero to 25° above zero, by how much did it change?

_____

MATHEMATICS

UNIT XI: INTEGERS AND RATIONALS

ITEM C : MULTIPLICATION AND DIVISION

OBJECTIVES

The student must be able to:

1. Calculate products of positive and negative integers.
2. Calculate products of positive and negative rational numbers.
3. Calculate quotients of positive and negative integers.
4. Calculate quotients of positive and negative rational numbers.
5. Use multiplication and division of integers and rational numbers in solving word problems.

LEARNING RESOURCES

Books: Refresher Mathematics, Stein

General Mathematics, Ginn and Company

Mathematics, A Basic Course, Cambridge Book Company

LEARNING ACTIVITIES

If you missed either objective 1 or 5 on the Diagnosis, get a copy of General Mathematics and read about "multiplication of integers" from page 99 to page 101. Then do the following exercises on page 102: 3(a-e), 5(a-e), 6(a-f) and 8. Check your answers with those in the back of the book.

If you missed either objective 3 or 5 on the Diagnosis, read pages 103 to 104 and do the following questions on page 104: 5(a-f), 6, 7, and 8. Check your answers with those in the back of the book.

If you missed objectives 2 on the Diagnosis, read about "multiplication of rational numbers" on page 111 and 112. Then do question 3(a-i) on pages 112 and 113. Check your answers with those in the back of the book.

If you missed objective 4 on the Diagnosis, read about "division of rational numbers" on page 113 and do question 2(a-f) on page 114. Check your answers with those in the back of the book.

If your work is correct to this stage, you are ready to write Item Progress Check XI C, Form 1. If you need further assistance, use one or more of the following:

OBJECTIVE	SOURCE MATERIALS	PAGE (S)	CONTENT
1	Refresher Mathematics	483-485	Information and Exercises
3	"	485,486	"
1	Mathematics, A Basic Course	308,309	"
3	"	310,311	"

After you have written Item Progress Check XI C, Form 1, and have met the criterion, go on to the next Item as indicated on your Diagnosis. If you do not meet the criterion, select additional work from the above table and, after completing it, write Item Progress Check XI C, Form 2. If you now meet the criterion, go on to the next item shown on your Diagnosis. If not, see your instructor.

If you have now completed all the work in Unit XI, you are ready to write Unit XI Progress Test, Form 1. If you meet the criterion, you have completed Unit XI and may select an additional math option if you wish. If you do not meet the criterion on the Unit Progress Test, see your instructor.

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Mathematics Item Progress Check

UNIT XI: INTEGERS AND RATIONALS Name: _____

ITEM C : MULTIPLICATION AND DIVISION Date: _____

Form 1

Criterion: 23/25
Score : __/__

(10) 1. Multiply.

a. $\begin{array}{r} +5 \\ +2 \\ \hline \end{array}$ b. $\begin{array}{r} -6 \\ -3 \\ \hline \end{array}$ c. $\begin{array}{r} +12 \\ -\ 1 \\ \hline \end{array}$ d. $\begin{array}{r} -9 \\ +3 \\ \hline \end{array}$ e. $\begin{array}{r} -4 \\ 0 \\ \hline \end{array}$

f. $(+7)\ (-2) =$ _____

g. $(-3)\ (-3)\ (-3) =$ _____

h. $(+2\ \frac{1}{2})\ (-2) =$ _____

i. $(+2.1)\ (-2.1) =$ _____

j. $(-7)\ (-7) =$ _____

(10) 2. Divide.

a. $(+5) \div (-1) =$ _____

b. $(-16) \div (-2) =$ _____

c. $0 \div (-17) =$ _____

d. $(-8) \div (+8) =$ _____

e. $(+3.5) \div (-7) =$ _____

(10) 2. Divide. (continued)

f. $\frac{-8}{-4} =$ ____ g. $\frac{-18}{-3} =$ ____ h. $\frac{-30}{-10} =$ ____

i. $\frac{-4.2}{10} =$ ____ j. $\frac{24}{-48} =$ ____

(3) 3. Do these.

a. $\frac{(-5)\ (-3)}{-5} =$ ____ c. $\frac{5 \times 6}{-3} =$ ____

b. $(-7) \div (-14) =$ ____

Problem: In the space below, show the work you do to solve problems. One mark is for your work and one mark is for the correct answer.

(2) 4. If the temperature was $+5^{o}$ and dropped 2^{o} in each of 5 hours, what is the new temperature?

Mathematics Item Progress Check

UNIT XI: INTEGERS AND RATIONALS Name: _____

ITEM C : MULTIPLICATION AND DIVISION Date: _____

Form 2

Criterion: 22/25
Score : __/__

(10) 1. Multiply.

a. $\begin{array}{r} -7 \\ \underline{-2} \end{array}$ b. $\begin{array}{r} -9 \\ \underline{+3} \end{array}$ c. $\begin{array}{r} +1 \\ \underline{-13} \end{array}$ d. $\begin{array}{r} -3 \\ \underline{0} \end{array}$ e. $\begin{array}{r} +5 \\ \underline{+5} \end{array}$

f. $(-6)(-2) =$ _____

g. $(-5)(-1)(-1) =$ _____

h. $(+13)(-2)(-1) =$ _____

i. $(+2.5)(-.5) =$ _____

j. $(+42)(+\frac{1}{2}) =$ _____

(10) 2. Divide.

a. $(-7) \div (-1) =$ _____

b. $(-19) \div (+19) =$ _____

c. $0 \div (+4) =$ _____

d. $(-1) \div (+3) =$ _____

e. $(+12) \div (-2) =$ _____

(10) 2. Divide. (continued)

f. $\frac{-9}{-3} =$ _____ g. $\frac{4}{-8} =$ _____ h. $\frac{+27}{+3} =$ _____

i. $\frac{5.6}{-10} =$ _____ j. $\frac{-10}{3} =$ _____

(3) 3. Do these.

a. $\frac{(-5) \times (-2)}{-10}$ _____

b. $(+3)\ (-6) \div 2 =$ _____

c. $\frac{(-9)\ (-8)}{(-6)\ (+12)} =$ _____

Problem: In the space below show the work you do to solve problems. One mark is for your work and one mark is for the correct answer.

(2) 4. If the temperature was $+10^{0}$ and rose 3 degrees an hour for 2 hours, what is the new temperature?

_____

MATHEMATICS

UNIT XI: INTEGERS AND RATIONALS

ITEM D : ORDER OF OPERATIONS

OBJECTIVES

The student must be able to:

1. Simplify expressions of sums and differences involving the removal of parentheses. (brackets)

2. Simplify expression of products and quotients involving the removal of parentheses.

3. State the order of operations rules as:

   Step 1. Perform operations within brackets.

   Step 2. Perform multiplication and division from left to right.

   Step 3. Perform addition and subtraction from left to right.

4. Simplify expressions involving sums, differences, products and quotients by applying the order of operations rules correctly. (see "3" above.)

LEARNING RESOURCES

Book: General Mathematics, Ginn and Company

LEARNING ACTIVITIES

If you missed any of objectives 1, 2, 3 or 4 on the Diagnosis, get a copy of General Mathematics and read about "order of operations" on pages 37 and 38. Then do exercises 1(a-f), 3(a-d), 4, 5, 6, 7, 8 and 9(a,b) on page 39. Check your answers with the answer key in the back of the book.

If your work is correct to this stage, you are ready to write Item Progress Check XI D, Form 1. If you need further assistance, re-read pages 37 and 38 and select additional exercises from page 39.

After you have written Item Progress Check XI D, Form 1, and have met the criterion, go on to the next Item as indicated on your Diagnosis. If you do not meet the criterion, select additional work from pages 37 to 39 and, after completing it, write Item Progress Check XI D, Form 2. If you now meet the criterion, go on to the next Item shown in your Diagnosis. If not, see your instructor.

If you have now completed all the work in Unit XI, you are ready to write Unit XI Progress Test, Form 1. If you meet the criterion, you have completed Unit XI and may select an additional math option if you wish. If you do not meet the criterion on the Unit Progress Test, see your instructor.

Mathematics Item Progress Check

UNIT XI: INTEGERS AND RATIONALS Name: _____

ITEM D : ORDER OF OPERATIONS Date: _____

Form 1

Criterion: 10/11
Score : __/__

(3) 1. State the order of operations rules.

1. _____

2. _____

3. _____

(8) 2. Simplify these expressions.

a. $5 - (3 + 2) =$ _____

b. $(8 + 4) \div 2 =$ _____

c. $(6 + 5) \div (17 - 6) =$ _____

d. $\frac{3 + 2}{3} - \frac{5 - 1}{2} =$ _____

e. $5[3 + 2(1 - 4)] =$ _____

f. $4 \times 5 + 2 + 3 =$ _____

g. $2 \times 3 + 4 \times 1 =$ _____

h. $-3\{4 + 2[-2 - 3(6 - 4) - 1]\} =$ _____

Mathematics Item Progress Check

UNIT XI: INTEGERS AND RATIONALS Name: _____

ITEM D : ORDER OF OPERATIONS Date: _____

Form 2

Criterion:	9/11
Score	: __/__

(3) 1. State the order of operations rules.

1. _____

2. _____

3. _____

(8) 2. Simplify these expressions.

a. $7 \times 4 + 2 =$ _____

b. $3 \times 2 + 5 + 1 =$ _____

c. $5 - 2 \times 1 + 3 =$ _____

d. $3(4 + 7) =$ _____

e. $-3(2 + 3) =$ _____

f. $6[5 + 2\ (3 - 1)] =$ _____

g. $\frac{4 + 2}{2} - \frac{1}{2} =$ _____

n. $4[(3 + 6) - (3 - 5)] - 2 =$ _____

MATHEMATICS

UNIT XI: INTEGERS AND RATIONALS

ITEM E : FACTORING

OBJECTIVES

The student must be able to:

1. Define factoring by factoring a non-prime positive whole number.
2. Define factor by identifying the factors in an example such as $3 \times 2 = 6$, where 3 and 2 are factors of 6.
3. Define a prime number as a number which has only itself and 1 as factors, such as the number 7 has only 1 and 7 as prime factors.
4. Factor given integers to prime factors by choosing your own factors.
5. Calculate the greatest common factor (G.C.F.) of a given pair of integers.
6. Calculate the lowest common multiple (L.C.M.) of a given pair of integers.

LEARNING RESOURCES

Books: Refresher Mathematics, Stein

General Mathematics, Ginn and Company

Mathematics, A Basic Course, Cambridge Book Company

LEARNING ACTIVITIES

If you missed any of objectives 1, 2 or 3 on the Diagnosis, get a copy of Mathematics, A Basic Course and read about "factors" on page 268.

If you missed any of objectives 1, 2, 3, 4 or 5 on the Diagnosis, get a copy of Refresher Mathematics and read about "Prime and Composite Numbers" on page 67 and 68. Then do "practice problems" 1, 3, 7 and 9 on page 68. Check your answers with those in the back of the book. Read page 75 and 76 and do practice problems 1, 3, 5, 7(a-f) and 9 on page 76. Check your answers.

If you missed objective 6 on the Diagnosis, read about "number multiples" on page 77 and 78. Then do "practice problems" 1, 3, 7 and 9 on page 78. Check your answers with those in the back of the book. Then do question 10 on page 79. Check your answers with another student or your instructor.

If your work is correct to this stage, you are ready to write Item Progress Check XI E, Form 1. If you need further assistance, use one or more of the following:

OBJECTIVE	SOURCE MATERIALS	PAGE(S)	CONTENT
2	General Mathematics	29	Information
3	"	40, 41	Information and Exercises
5	"	43, 45	"
6	"	44, 45	"

After you have written Item Progress Check XI E, Form 1, and have met the criterion, go on to the next Item as indicated on your Diagnosis. If you do not meet the criterion, select additional work from the above table and, after completing it, write Item Progress Check XI E, Form 2. If you now meet the criterion, go on to the next Item shown on your Diagnosis. If not, see your instructor.

If you have now completed all the work in Unit XI, you are ready to write Unit XI Progress Test, Form 1. If you meet the criterion, you have completed Unit XI and may select an additional math option if you wish. If you do not meet the criterion on the Unit Progress Test, see your instructor.

Mathematics Item Progress Check

UNIT XI: — INTEGERS AND RATIONALS Name: _____

ITEM E : FACTORING Date: _____

Form 1

Criterion: 10/10
Score : __/__

(2) 1. Factor these numbers.

a. 6 = _____ b. 9 = _____

(1) 2. In this example 4 X 3 = 12. The 3 and 4 are _____

(1) 3. What is a "prime number"? _____

_____

(4) 4. Factor these numbers to prime factors.

a. 42 = _____ c. 50 = _____

b. 286 = _____ d. 1,000 = _____

(1) 5. Find the greatest common factor of 40 and 48.

_____

(1) 6. Find the lowest common multiple of 15 and 20.

_____

Mathematics Item Progress Check

UNIT XI: INTEGERS AND RATIONALS Name: _____

ITEM E : FACTORING Date: _____

Form 2

Criterion: 9 /10
Score : __/__

(2) 1. Factor these numbers.

a. 4 = _____ b. 15 = _____

(1) 2. In the example 7 X 3 = 21, the 7 and the 3 are _____ of 21.

(1) 3. What is a "prime number"? _____

_____

(4) 4. Factor these numbers to prime factors.

a. 36 = _____ c. 54 = _____

b. 84 = _____ d. 216 = _____

(1) 5. Find the greatest common factor of 42 and 60.

_____

(1) 6. Find the lowest common multiple of 18 and 24.

_____

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MATHEMATICS

UNIT XI: INTEGERS AND RATIONALS

ITEM F : PROBLEM SOLVING

OBJECTIVES

The student must be able to:

1. Apply the steps in solving a problem - that is -
   a. Write what is to be found.
   b. Write a word sentence using given facts and telling what is to be found, including what operations are to be used.
   c. Write a number sentence in symbols using given facts and telling what is to be found.
   d. Solve the number sentence. (Calculate what is not known.)
   e. Write the answer to the original problem.
2. Apply each or all of the above in solving a given problem.

LEARNING RESOURCES

Books: Mathematics, A Basic Course, Cambridge Book Company

General Mathematics, Ginn and Company

Refresher Mathematics, Stein

LEARNING ACTIVITIES

If you have missed either objective 1 or 2 on the Diagnosis, review the objectives listed here and get a copy of General Mathematics. Do problems 48, 49 and 50 on page 94, problems 39 and 40 on page 98, problems 8, 9 and 10 on page 102, and problem 7(a, c and d) on page 45. Check your answers with those in the back of the book.

If your work is correct to this stage, you are ready to write Item Progress Check XI F, Form 1. If you need further assistance, use one or more of the following:

OBJECTIVE	SOURCE MATERIALS	PAGE(S)	CONTENT
1, 2	Mathematics, A Basic Course	305, 307, 308.	Problems
1, 2	Refresher Mathematics	476-478	"

After you have written Item Progress Check XI F, Form 1, and have met the criterion, you are ready to write Unit XI Progress Test, Form 1. If you meet the criterion on Unit XI Progress Test, you have completed Unit XI and may select an additional math option if you wish. If you do not meet the criterion on the Unit Progress Test, see your instructor.

If you do not meet the criterion on Item Progress Check XI F, Form 1, select additional work from the above table and, after completing it, write Item Progress Check XI F, Form 2. If you do not meet the criterion, see your instructor.

If you meet the criterion on the Item Progress Check, you are ready to write Unit XI Progress Test, Form 1. If you meet the criterion on Unit Progress Test XI you have completed Unit XI and may select an additional math option if you wish. If you do not meet the criterion on the Unit Progress Test, see your instructor.

Mathematics Item Progress Check

UNIT XI: INTEGERS AND RATIONALS Name: _____

ITEM F : PROBLEM SOLVING Date: _____

Form 1

Criterion:	9/10
Score :	__/__

Problems: In the space below, show the work you do to solve problems. One mark is for your work and one mark is for each correct answer.

(2) 1. You have a bank account containing \$150. and write cheques of \$110. for rent, \$5. for telephone, and \$20. for heat and electricity. If you deposit \$50. what will be the balance in your account?

(2) 2. If the temperature is 35^{o} at noon and it drops by 50^{o} overnight, what is the low night temperature?

(2) 3. If the temperature was 14^{o} and dropped to -10^{o} in 8 hours, by how many degrees did the temperature fall in each hour?

(4) 4. Find the greatest common factor and the lowest common multiple of the numbers 21 and 28.

Mathematics Item Progress Check

UNIT XI: INTEGERS AND RATIONALS Name: _____

ITEM F : PROBLEM SOLVING Date: _____

Form 2

Criterion:	10/11
Score :	__/__

Problems: In the space below, show the work you do to solve problems. One mark is for your work and one mark is for each correct answer.

(2) 1. What is the difference in altitude between a point 125 feet below sea level and a mountain 3500 feet above sea level?

(4) 2. Find the greatest common factor and the lowest common multiple of the numbers 24 and 32.

(2) 3. If the temperature was 20^{o} at noon and drops by 3 degrees each hour, what will the temperature be by 8 PM?

(3) 4. If you have $75.00 in a bank account and write cheques for $30.00, $25.00 and two cheques for $15.00 each, what will be your balance? Is your account overdrawn?

Mathematics Unit Progress Test

UNIT XI: INTEGERS AND RATIONALS Name: _____

Form 1 Date: _____

Criterion: 24/27
Score : __/__

(2) 1. a. Circle the whole numbers in the following list.

$\frac{1}{2}$ 3 7.5 $9\frac{2}{3}$ 15

b. Circle the integers in the following list.

3 $\frac{7}{3}$ 2.8 9 $3\frac{1}{8}$

(1) 2. Give an example of a rational number which is not an integer.

_____

(1) 3. What is the opposite of 4? _____

(1) 4. Arrange these numbers from smallest to largest.

$\frac{1}{3}$, $-\frac{1}{2}$, 0, 3, $-\frac{3}{4}$, $\frac{7}{8}$

_____ _____ _____ _____ _____ _____

(8) 5. Calculate.

a. $7 + (-1) =$ _____

b. $(-1\frac{3}{4}) + (+2) =$ _____

c. $(13)(2) =$ _____

d. $(-9)(-6) =$ _____

e. $\frac{(-5)}{(-15)} =$ _____

5. Calculate. (continued)

f. $(7\ \frac{1}{4})\ (-3) =$ _____

g. $(+5) - (-2) =$ _____

h. $(-6) - 7 =$ _____

(3) 6. State whether the following are true or false.

a. $\frac{-4}{7} = \frac{4}{-7}$ _____ c. $\frac{-4}{-8} = \frac{1}{2}$ _____

b. $(3)\ \frac{(1)}{-3} = 0$ _____

(3) 7. Simplify.

a. $5 \times 6 + 4 - 2 + 1 =$ _____

b. $-6\ [-3 + 4(6 - 5) + 2(3 + 1)] =$ _____

c. $2\left\{7 - 3\ [7 + 4\ (\frac{1}{2} - \frac{1}{2})] + 3\right\} =$ _____

(1) 8. State the first 5 prime numbers starting with 1.

1 ____ ____ ____ ____

(1) 9. Write all the whole numbers which are factors of 4.

_____

(2) 10. Factor these to prime factors.

a. $64 =$ _____ b. $200 =$ _____

(2) 11. Find the G.C.F. and L.C.M. of 9 and 24.

G.C.F. _____ L.C.M. _____

Problems: In the space below, show the work you do to solve problems. One mark is for your work and one mark is for the correct answer.

(2) 12. If your bank balance was $35 and you wrote three cheques for $15 each and deposited two $15 cheques, what would your new balance be?

Mathematics Unit Progress Test

UNIT XI: INTEGERS AND RATIONALS Name: _____

Form 2 Date: _____

Criterion: 26/29
Score : __/__

(2) 1. a) Circle the positive integers in the following list.

$2 \quad \frac{1}{8} \quad -9 \quad 2.7 \quad 9$

b) Circle the negative integers in the following list.

$2 \quad -2 \quad -9 \quad -\frac{2}{3} \quad -3\frac{1}{8}$

(4) 2. Match.

a. $\frac{1}{8}$ _____ whole number

b. -1 _____ rational number

c. +17 _____ negative integer

d. 10 _____ positive integer

(1) 3. What is the opposite of -9? _____

(6) 4. Calculate.

a. (-18) + 0 = _____

b. (-7) (3) = _____

c. $\frac{28}{-4}$ = _____

d. +9 - 7 = _____

4. Calculate, (continued)

e. $(-1) + (-6) - (-1) =$ _____

f. $\frac{-3}{4} \times \frac{1}{3} =$ _____

(3) 5. State whether the following are true or false.

a. $\frac{-3}{5} = -\frac{3}{5}$ _____ c. $(-3)(-2) = 5$ _____

b. $17 - (-1) = 16$ _____

(3) 6. Simplify.

a. $2\frac{3}{4}(-6) \div \frac{1}{2} + 3 =$ _____

b. $2 \times 3 - 4 \times 6 \div 2 =$ _____

c. $16 - 6[3(1 + 6) - 2] =$ _____

(2) 7. a. State all the factors of 12.

_____

b. Which of these are prime numbers?

_____

(2) 8. Factor to prime factors.

a. 225 _____ b. 170 _____

(2) 9. Find the G.C.F. and L.C.M. of 15 and 35.

a. G.C.F. _____ b. L.C.M. _____

Problems: In the space below, show the work you do to solve problems. One mark is for your work and one mark is for the correct answer.

(2) 10. What is the difference in altitude between a point 350 feet below sea level and a point 1600 feet above sea level?

---

(2) 11. The temperature at noon was 23^{o} and at 8 p.m. it was -9^{o}. Write a number which indicates value and direction of the average change in temperature each hour from noon to 8 p.m.

Mathematics Diagnosis

UNIT XII: INTRODUCTORY ALGEBRA

Name: _____

Date: _____

OBJECTIVE

1. a. Give an example of a constant. _____ A-1

   b. Give an example of a variable. _____

2. a. Give an example of a term. _____ A-2

   b. Give an example of an expression. _____

3. Write expressions for the following. A-3

   a. one more than x _____

   b. 5 less than a _____

   c. the sum of x and y _____

   d. the product of a and b _____

   e. the quotient of m divided by n _____

   f. three times the sum of x and y _____

   g. six times x _____

   h. two more than three times x _____

   i. the next two consecutive numbers after "a"

      _____

   j. two fifths of m _____

4. a. A monomial is a polynomial of _____ terms. A-4

   b. A binomial is a polynomial of _____ terms.

   c. A trinomial is a polynomial of _____ terms.

OBJECTIVE

5. Simplify. Show your work. — A-5, A-6

a. $5a + 4a =$ _____

b. $6a - 2a =$ _____

c. $4xy - 2xy =$ _____

d. $(4a + 2b) - (a-b) =$ _____

e. $x^2y - y + 2y + 4x^2y =$ _____

f. Add. $\begin{array}{r} 4a + 2b - c \\ \underline{6a - 3b + 7c} \end{array}$

g. Subtract. $\begin{array}{r} 7x - 2y + 8z \\ \underline{7x + 4y - z} \end{array}$

6. Find the product. Show your work. — A-7

a. $a(b+c) =$ _____

b. $(x^2)(y^2) =$ _____

c. $a^2(x + y) =$ _____

d. $(x + y)(a + b + c) =$ _____

e. $(a + b)(3a + 2b + c) =$ _____

7. Divide. Show your work. A-8

a. $ab \div a =$ _____

b. $\frac{xy}{y} =$ _____

c. $\frac{9\ xy}{9\ x} =$ _____

d. $\frac{2x + 4y}{2} =$ _____

e. $\frac{5a + 10ab}{5a} =$ _____

f. $a \overline{)\ 5a + 2ab + 3ac} =$ _____

8. Evaluate each when $a = 2$, $b = -3$ and $c = 4$. Show your work. A-9

a. $2a =$ _____

b. $3ab =$ _____

c. $\frac{a + b}{c} =$ _____

d. $3a - 2b + c =$ _____

e. $a^2 + 2ab + b^2 =$ _____

9. Given $4 + x = 6$, is this a closed sentence or an open sentence? B-1

_____

10. Give an example of a closed sentence. B-2

_____

11. Write open sentences for these. B-3

a. two plus a number is 5 _____

b. three less than a number is 6 _____

c. twice the product of a and b is 10 _____

d. four times the sum of a number and 3 is 12

_____

e. the difference of 5 and 3x is 2 _____

12. Solve. Show your work.

B-4

a. $x + 2 = 6$ $x =$ _____

b. $2(x - 3) = 4$ $x =$ _____

c. $2a - 1 = 5$ $a =$ _____

d. $\frac{a}{4} = 2$ $a =$ _____

e. $\frac{10}{a} = 5$ $a =$ _____

13. Solve. Show your work.

C-1

a. $32 + a = 63$ _____

b. $a - 27 = 41$ _____

c. $2a = 32$ _____ C-2

d. $\frac{a}{6} = 180$ _____ C-2

e. $\frac{56}{x} = 8$ _____ C-2

14. Solve each of these formulas for the variable indicated. Show your work. C-3

a. $I = prt$ $t =$ _____

b. $V = LWH$ $W =$ _____

c. $d = rt$ $r =$ _____

d. $A = \frac{1}{2} bh$ $h =$ _____

e. $p = 2L + 2W$ $L =$ _____

15. Solve. Show your work.

a. $2a + 5 = 35$ $a =$ _____ C-4

b. $\frac{2a}{5} - 4 = 0$ $a =$ _____ C-4

c. $5a + 3 = 8a - 3$ $a =$ _____ C-4

d. $2(x - 3) = 14$ $x =$ _____ C-5

e. $(x + 1) + (x + 2) + (x + 3) = 18$

$x =$ _____ C-5

16. Solve this problem by first writing a word sentence showing how the facts and unknown are related, then writing an open sentence and then solving the open sentence. Show all your work. C-6, E-1, E-2

Problem: Bill is 7 years older than his sister. If Bill is 21, how old is his sister?

17. a. a^2 means _____ D-1

b. a^5 means _____

c. $(ab)^4$ means _____

18. In $5a^2$, the base is the _____, the coefficient is the _____ and the exponent is the _____. D-2

19. Simplify. Show your work.

a. $(a^2)(a^3) =$ _____ D-3

b. $\frac{x^5}{x^2} =$ _____ D-4

c. $(x^3)^2 =$ _____ D-5

d. $\frac{(x^2y^3)}{(xy^2)} \frac{(x^2y)}{(y)} =$ _____ D-6

e. $[5(ab)^2]\ [4a^2b] =$ _____ D-6

20. A bottle filled with varnish costs \$1.10. If the varnish is worth \$1.00 more than the bottle, find the value of the bottle. Be sure to check your solution and show your algebraic equation. Show all your work. E-1, E-2

MATHEMATICS

UNIT XII: INTRODUCTORY ALGEBRA

ITEM A: VARIABLES AND EXPRESSIONS

OBJECTIVES

The student must be able to:

1. Define a variable and a constant by giving an example of each.
2. Define a term and an expression by giving an example of each.
3. Write expressions from word statements using sums, differences, products and quotients containing variables and constants.
4. Define a monomial, a binomial and a trinomial as polynomials with one, two and three terms respectively.
5. Calculate sums and differences of expressions containing variables.
6. Simplify expressions involving addition and subtraction.
7. Calculate products of monomials and monomials, monomials and binomials, binomials and trinomials.
8. Calculate quotients of monomials, binomials and trinomials divided by monomials.
9. Evaluate expressions given values for variables.

LEARNING RESOURCES

Books: Refresher Mathematics, Stein
General Mathematics, Ginn and Company
Mathematics, A Basic Course, Cambridge Book Company
Senior Technical Mathematics, Haywood

LEARNING ACTIVITIES

If you missed any of objectives 1, 2 or 4 on the Diagnosis, get a copy of General Mathematics and read pages 127 and 128. Then do exercises 1 to 4 on pages 128 and 129. Check your answers with another student or your instructor.

If you missed objective 3 on the Diagnosis, read about "translating English phrases into algebraic expressions" on page 183. Then, on page 184, do question 2 (a-h), 4 (a-c), 5 (a-d), and 8. Check your answers with those in the back of the book.

If you missed any of objectives 4, 5 or 6 on the Diagnosis, read about "addition and subtraction of like terms" on pages 129 and 130. Then do questions 3, 4, 5, 8, 11 and 12 on page 131. Check your answers with those in the back of the book. Read about "Polynomials" from page 139 to 141. Then do question 2(a-o) on page 141. Check your answers. Read about "addition of polynomials" on page 143 and the top of page 144. Do questions 12, 13, 16, 17, 19, 20 and 21 on page 144. Then read about "subtraction of polynomials" on pages 144 and 145. Do questions 2, 3, 4, 5 and 6 on page 145. Check your answers.

If you missed objective 7 on the Diagnosis, read about "multiplication of terms" on pages 131 and 132. Then on page 133, do questions 1(a-h), 2(a-f), 3, 4 and 5. Check your answers with another student or your instructor. Then read about "multiplication of a polynomial by a monomial" on page 146 and do questions 2(a-o), 3(a-c) and 4a. Check your answers with those in the back of the book.

If you missed objective 8 on the Diagnosis, read about "Division of Terms" on page 133 and 134 and do quesitons 1(a-h), 2(a-i) and 3 on page 134. Check your answers with another student or your instructor.

If you missed objective 9 on the Diagnosis, read about "numerical values of polynomials" on pages 141 and 142. Then do questions 3(a-h) and 4(a-c) on page 143. Check your answers with those in the back of the book.

If your work is correct to this stage, you are ready to write Item Progress Check XII A, Form 1. If you need further assistance use one or more of the following:

Objective	Source Materials	Page(s)	Content
1, 2, 3	Refresher Mathematics	487-489	information & exercises
5, 6, 9	"	493-495	"
1, 2, 3	Mathematics, A Basic Course	259-264	"
4	"	268- 269	"
9	"	265-267	"
5, 6	"	268-271	"
5, 6, 7, 8, 9	Senior Technical Mathematics	1-4	"

After you have written Item Progress Check XII A, Form 1, and have met the criterion, go on to the next Item as indicated on your Diagnosis. If you do not meet the criterion, select additional work from the above table and, after completing it, write Item Progress Check XII A, Form 2. If you now meet the criterion, go on to the next Item shown on your Diagnosis. If not, see your instructor.

If you have now completed all the work in Unit XII, you are ready to write Unit XII Progress Test, Form 1. If you meet the criterion, you have completed Unit XII and may select an additional Math. option if you wish. If you do not meet the criterion on the Unit Progress Test, see your instructor.

Mathematics Item Progress Check

UNIT XII: INTRODUCTORY ALGEBRA Name: _____

ITEM A: VARIABLES AND EXPRESSIONS Date: _____

Form 1

Criterion:	19 /20
Score:	___/___

(1) 1. Give an example of a variable. _____

(3) 2. Write mathematical expressions for these:

a. the sum of x and 2 _____

b. one third of x _____

c. five times the sum of a and b _____

(3) 3. Define these by giving an example of each.

a. term _____

b. expression _____

c. binomial _____

(10) 4. Simplify these expressions.

a. $2a + 3a =$ _____

b. $2ab + 4a + 3ab =$ _____

c. $7y - 7 - 2y =$ _____

d. $(3a + 2b) + (5a - b) =$ _____

e. $x(a + b) =$ _____

f. $(x + y)(a + b + c) =$ _____

g. $\frac{2a + 4b}{2} =$ _____

h. $\frac{a + 6ab + 2ac}{a} =$ _____

i. $(5x + 2y) - (3x - 5y) =$ _____

j. $4x^2 - 8x - 5 - 10 - 9x^2 + 11 - 2x =$ _____

(3) 5. When $x = 2$, $y = -5$ and $z = 3$, find the value of:

a. xyz _____ b. $\frac{xy}{z}$ _____

c. $x + y + z$ _____

Mathematics Item Progress Check

UNIT XII: INTRODUCTORY ALGEBRA Name: _____

ITEM A: VARIABLES AND EXPRESSIONS Date: _____

Form 2

Criterion: 18/20
Score: ___/___

(1) 1. Give an example of a constant. _____

(3) 2. Write mathematical expressions for these.

a. three consecutive numbers _____

b. 3 times the sum of a number and 8 _____

c. $\frac{1}{3}$ of the difference of a number and 5 _____

(3) 3. Define these by giving examples.

a. term _____

b. expression _____

c. binomial _____

(10) 4. Simplify these.

a. $5x - 2x =$ _____

b. $3x - 2xy + 5x =$ _____

c. $8m - 3 - 6m =$ _____

d. $(5x + 2y) + (7x - 4y) =$ _____

e. $2(c+d) =$ _____

f. $(x+y)(d + e + f) =$ _____

g. $\frac{6a + 3b}{3} =$ _____

h. $\frac{xy - xz}{x}$ = _____

i. $(2x - y) - (5x + 3y)$ = _____

j. $6x^2 - 9x - 5 - 6 + 9x^2 + 12 - 3x$ = _____

(3) 5. When a = 1, b = -1 and c = 4, what is the value of these expressions?

a. abc = _____

b. $\frac{bc}{a}$ = _____

c. 2a + 3b - c = _____

MATHEMATICS

UNIT XII: INTRODUCTORY ALGEBRA

ITEM B: SENTENCES

OBJECTIVES

The student must be able to:

1. Identify closed sentences as equations without variables and open sentences as equations with variables.
2. Define closed and open sentences by giving examples of each.
3. Write open sentences from verbal statements
4. Solve simple open sentences by inspection and substitution of trial roots.

LEARNING RESOURCES

Books: Refresher Mathematics, Stein
General Mathematics, Ginn and Company
Mathematics, A Basic Course, Cambridge Book Company

LEARNING ACTIVITIES

If you missed any of objectives 1, 2, 3 or 4 on the Diagnosis,

get a copy of General Mathematics and read pages 166 and 167. Then do questions 1(a-f), 2(a-i) and 3(a-f) on page 167. Check your answers with another student or your instructor. Then read about "Introduction to equations" on page 168 and do question 1(a-l) on page 168. Check your answers with another student or your instructor.

If your work is correct to this stage, you are ready to write Item Progress Check XII B, Form 1. If you need further assistance, use one or more of the following:

Objective	Source Materials	Page (s)	Content
1,2,3	Refresher Mathematics	490-493	information & exercises
4	"	496, 497	"
3	Mathematics, A Basic Course	272-276	"

After you have written Item Progress Check XII B, Form 1, and have met the criterion, go on to the next Item as indicated on your Diagnosis. If you do not meet the criterion, select additional work from the above table and, after completing it, write Item Progress Check XII B, Form 2. If you now meet the criterion, go on to the next Item shown on your Diagnosis. If not, see your instructor.

If you have now completed all the work in Unit XII, you are ready to write Unit XII Progress Test, Form 1. If you meet the criterion, you have completed Unit XII and may select an additional Math. option if you wish. If you do not meet the criterion on the Unit Progress Test, see your instructor.

Mathematics Item Progress Check

UNIT XII; INTRODUCTORY ALGEBRA Name: _____

ITEM B: SENTENCES Date: _____

Form 1

Criterion:	9 /10
Score:	___/___

(1) 1. Given 4 + 3 = 7 and x + 3 = 7, which is an open sentence?

_____

(5) 2. Write open sentences for these.

a. The sum of three consecutive numbers is 18.

_____

b. The sum of a number and 2 is 6.

_____

c. 3 subtracted from twice a number is 6

_____

d. A number divided by 2 is 8

_____

e. The product of 5 and a number is 10.

_____

(4) 3. Solve these open sentences by finding the value for the variable which makes each one true.

a. $x + 4 = 6$ $x =$ _____

b. $2a = 14$ $a =$ _____

c. $\frac{n}{5} = 5$ $n =$ _____

d. $2b - 3 = 7$ $b =$ _____

Mathematics Item Progress Check

UNIT XII: INTRODUCTORY ALGEBRA Name: _____

ITEM B: SENTENCES Date: _____

Form 2

Criterion:	9 / 10
Score:	___/___

(1) 1. Given 4 + 8 = 12 and 3a + 7 = 22, which is a closed sentence?

_____

(5) 2. Write open sentences for these.

a. 3 subtracted from a number is 8

_____

b. 5 times the subtraction of 2 from a number is 30.

_____

c. A number divided by 4 and 8 added to the result is 20.

_____

d. The sum of two consecutive numbers is 11.

_____

e. The product of 3 and a number is 15.

_____

(4) 3. Solve these open sentences.

a. $x - 5 = 8$ $x =$ _____

b. $\frac{2a}{5} = 10$ a = _____

c. $3m = 15$ m = _____

d. $5 + n = 13$ n = _____

UNIT XII: INTRODUCTORY ALGEBRA

ITEM C: ALGEBRAIC SOLUTIONS

OBJECTIVES

The student must be able to:

1. Solve open sentences by applying the addition and subtraction properties of equality. (If $a = b$, then $a + c = b + c$, and if $a = b$ then $a - c = b - c$.)

2. Solve open sentences by applying the multiplication and division properties of equality. (If $a = b$ then $a \cdot c = b \cdot c$ and if $a = b$ then $\frac{a}{c} = \frac{b}{c}$.)

3. Apply the properties of equality to isolate a given variable in formulas such as $I = prt$, $V = LWH$, $A = \frac{1}{2}bh$, $P = 2L + 2W$, $d = rt$.

4. Solve open sentences where application of combinations of properties of equality are required.

5. Solve open sentences where simplification of expressions is required prior to application of properties of equality.

6. Use algebraic solutions in equations of one unknown and the steps in problem solving to solve word problems.

LEARNING RESOURCES

Books: Refresher Mathematics, Stein
General Mathematics, Ginn and Company
Mathematics, A Basic Course, Cambridge Book Company
Senior Technical Mathematics, Heywood

LEARNING ACTIVITIES

If you missed objective 1 on the Diagnosis, get a copy of Refresher Mathematics and read about "solving equations in one variable" and""Basic Type I" on pages 498 and 499. Then do practice problems 1, 3, 5, 7, 9, 11, 13, 15 and 17 on page 499. Check your answers with those in the back of the book. Then read about "Basic Type II" on page 500 and do practice problems 1, 3, 5, 7, 9, 11, 13, 15, and 17 on page 500. Check your answers.

If you missed objective 2 on the Diagnosis, read about "Basic Type III" on pages 500 and 501 and do practice problems 1, 3, 5, 7, 9, 11, 13, 15 and 17 on page 501. Check your answers with those in the back of the book. Then read about "Basic Type IV" on page 501 and do practice problems 1, 3, 5, 7, 9, 11, 13, 15 and 17 on the top half of page 502.

If you missed objective 3 on the Diagnosis, read about "formulas" on page 496, do question 1 (a,b,c and d) on page 497. and check your answers with those in the back of the book. Then do question 2 (a,b,c and d) on page 497. Check your answers with another student or your instructor.

If you missed objective 4 on the Diagnosis, read about "solution by more than one axiom" on page 502. Then do practice problems 1, 3, 5, 7, 9 and 11 on the bottom of page 502. Check your answers with those in the back of the book.

If you missed objective 5 on the Diagnosis, get a copy of General Mathematics and read about "simplification of polynomials" on page 140 and 141. Then do question 2 (a-k) on page 141. Check your answers with those in the back of the book.

If you missed objective 6 on the Diagnosis, read page 183 and do question 2 (a-f), 3(a,b,c), 4(a,b,c), 5(a,b,c) and 8 on page 184. Check your answers with those in the back of the book. Then read pages 185 to 188. Study each example on those pages carefully and review the five steps on page 188. Then do problems 1, 2, 3 and 4 on page 188. Check your answers.

If your work is correct to this stage, you are ready to write Item Progress Check XII C, Form 1. If you need further assistance, use one or more of the following:

Objective	Source Materials	Page(s)	Content
1	General Mathematics	170-172	information & exercises
2	"	173-175	"
4	"	175-177	"
1, 2	Mathematics, A Basic Course	275-284	"
4	"	284-288	"
3, 6	"	289-294	"
1 to 6	Senior Technical Mathematics	9-16	"

After you have written Item Progress Check XII C, Form 1, and have met the criterion, go on to the next Item as indicated on your Diagnosis. If you do not meet the criterion, select additional work from the above table and, after completing it, write Item Progress Check XII C, Form 2. If you now meet the criterion go on to the next Item shown on your Diagnosis. If not, see your instructor.

If you have now completed all the work in Unit XII, you are ready to write Unit XII Progress Test, Form 1. If you meet the criterion, you have completed Unit XII and may select an additional Math. option if you wish. If you do not meet the criterion on the Unit Progress Test, see your instructor.

Mathematics Item Progress Check

UNIT XII: INTRODUCTORY ALGEBRA Name: _____

ITEM C: ALGEBRAIC SOLUTIONS Date: _____

Form 1

Criterion:	14/15
Score:	___/___

(10) 1. Solve these equations.

a. $x + 17 = 23$ $x =$ _____

b. $a - 15 = 49$ $a =$ _____

c. $2a = 42$ $a =$ _____

d. $\frac{1}{5} a = 17$ $a =$ _____

e. $2x - 3 = 27$ $x =$ _____

f. $2m - 5 = m + 4$ $m =$ _____

g. $2 (x-2) = 20$ $x =$ _____

h. $17a + 15a = 64$ $a =$ _____

i. $\frac{2}{3} (x-6) = -4$ $x =$ _____

j. $47 = 7a + 5$ $a =$ _____

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(2) 2. Solve the indicated variable in each of these.

a. $I = prt$ $r =$ _____

b. $P = 2L + 2W$ $W =$ _____

Problem: In the space below, show the work you do to solve problems. One mark is for naming the variable or variables, one mark is for making an equation and one mark is for solving the equation.

(3) 3. How wide is a rectangle which is 8 ft. long and has an area of 48 sq. ft.?

_____

Mathematics Item Progress Check

UNIT XII: INTRODUCTORY ALGEBRA Name: _____

ITEM C: ALGEBRAIC SOLUTIONS Date: _____

Form 2

Criterion: 13/15
Score: ___/___

(10) 1. Solve these equations.

a. $13 + x = 27$ $x =$ _____

b. $m - 21 = 19$ $m =$ _____

c. $3a = 51$ $a =$ _____

d. $\frac{1}{3} a = 13$ $a =$ _____

e. $5x - 2 = 48$ $x =$ _____

f. $3a - 5 = 7a + 7$ $a =$ _____

g. $2(x-3) = 10$ $x =$ _____

h. $31a + 5a = 36$ $a =$ _____

i. $\frac{2}{3} (a + 9) = -6$ $a =$ _____

j. $50 = 5a + 25$ $a =$ _____

(2) 2. Solve the indicated variable in each of these.

a. $A = \frac{1}{2}bh$ $h =$ _____

b. $V = LWH$ $L =$ _____

Problem: In the space below, show the work you do to solve problems. One mark is for naming the variable or variables, one mark is for making an equation and one mark is for solving the equation.

(3) 3. A bus has 48 passengers. If there were 14 fewer men than women in the bus, how many men were there?

_____

MATHEMATICS

UNIT XII: INTRODUCTORY ALGEBRA

ITEM D: POWERS

OBJECTIVES

The student must be able to:

1. Define a power by showing multiplication (a^3 means a x a x a).
2. Identify coefficient, base and exponent in an example of a power.
3. Apply the law of adding exponents when finding products of powers ($a^m \times a^n = a^{m+n}$).
4. Apply the law of subtracting exponents when finding quotients of powers ($a^m \div a^n = a^{m-n}$).
5. Apply the law of multiplying exponents when finding powers of powers ($(a^m)^n = a^{mn}$).
6. Simplify expressions involving powers by applying the appropriate laws correctly with integer exponents.

LEARNING RESOURCES

Books: General Mathematics, Ginn and Company
Senior Technical Mathematics, Heywood

LEARNING ACTIVITIES

If you missed either objective 1 or 2 on the Diagnosis, get a copy of General Mathematics and read about "powers" on page 134 and 135. Then do question 5 (a-h) on page 135. Check your answers with those in the back of the book.

If you missed any of objectives 3, 5 or 6 on the Diagnosis, read about "multiplication of powers" on page 136 and the top part of page 137. Then do questions 2(a-n), 3, 4, and 5 on page 137. Check your answers.

If you missed either objective 4 or 6 on the Diagnosis, read about "division of powers" on page 137 and about "negative exponents" on page 138. Then do questions 3(a-h), 4(a,b), 5(a,b), 6(a,b), 7a, 8(a,b), 9(a,b) and 10 on page 139. Check your answers.

If your work is correct to this stage, you are ready to write Item Progress Check XII D, Form 1. If you need further assistance, re-read pages 134 to 139 for the objectives with which you are having difficulty. Do additional exercises from those pages and check your work. You may also use one or more of the following:

Objective	Source Materials	Page(s)	Content
1, 2	Senior Technical Mathematics	115,116	information & exercises
3,4,5,6	"	116-120	"

After you have written Item Progress Check XII D, Form 1, and have met the criterion, go on to the next Item as indicated on your Diagnosis. If you do not meet the criterion, select additional work from pages 134 to 139 in the book General Mathematics, or form the above table and, after completing it, write Item Progress Check XII D, Form 2. If you now meet the criterion, go on to the next Item shown on your Diagnosis. If not, see your instructor.

If you have now completed all the work in Unit XII, you are ready to write Unit XII Progress Test, Form 1. If you meet the criterion, you have completed Unit XII and may select an additional math option if you wish. If you do not meet the criterion on the Unit Progress Test, see your instructor.

Mathematics Item Progress Check

UNIT XII: INTRODUCTORY ALGEBRA Name: _____

ITEM D: POWERS Date: _____

Form 1

Criterion: 9 / 10
Score: ___/___

(1) 1. a^4 means _____

(3) 2. In $5a^4$, the 5 is the _____, the a is the _____ and the 4 is the _____.

(6) 3. Simplify these.

a. $(a^2)(a^3) =$ _____

b. $\frac{a^6}{a^2} =$ _____

c. $(a^3)^5 =$ _____

d. $\frac{(a^2b)^2\,(a^2)}{a^8} =$ _____

e. $\frac{(ax)^2\,(5a^3)^2}{10x^2} =$ _____

f. $\frac{x^4}{x^6} =$ _____

Mathematics Item Progress Check

UNIT XII: INTRODUCTORY ALGEBRA Name: _____

ITEM D: POWERS Date: _____

Form 2

Criterion: 9 / 10
Score: ___/___

(1) 1. a^3 means _____

(3) 2. In $6x^3$ the 6 is the _____, the x is the _____ and the 3 is the _____.

(6) 3. Simplify these.

a. $(a^5)(a^2) =$ _____

b. $\frac{a^6}{a^5} =$ _____

c. $(a^5)^2 =$ _____

d. $\frac{(a^2b)^2\,(a)}{a^9} =$ _____

e. $\frac{x^4}{x^7} =$ _____

f. $\frac{(5x)^3\,(x^2)}{25x^2} =$ _____

MATHEMATICS

UNIT XII: INTRODUCTORY ALGEBRA

ITEM E: PROBLEM SOLVING

OBJECTIVES

The student must be able to:

1. Apply the steps in solving a problem - that is -

   a. Write what is to be found.

   b. Write a word sentence using given facts and telling what is to be found, including what operations are to be used.

   c. Write a number sentence in symbols using given facts and telling what is to be found.

   d. Solve the number sentence. (Calculate what is not known).

   e. Write the answer to the original problem.

2. Apply each or all of the above in solving a given problem.

LEARNING RESOURCES

Books: Mathematics, A Basic Course, Cambridge Book Company
General Mathematics, Ginn and Company
Senior Technical Mathematics, Heywood

LEARNING ACTIVITIES

If you have missed either objective 1 or 2 on the Diagnosis, review the objectives listed here and get a copy of General Mathematics. Read about "translating English phrases into algebraic expressions" on page 183. Then do question 1(a-i) on page 183. Check your answers with another student or your instructor. Then read pages 185 to 188, looking carefully at each example. Note the list of steps on page 188. Do questions 5, 6, 9, 10, 13 and 14 on pages 188 and 189. Check your answers with those in the back of the book.

If your work is correct to this stage, you are ready to write Item Progress Check XII E, Form 1. If you need further assistance, use one or more of the following:

Objective	Source Materials	Page(s)	Content
1, 2	Mathematics, A Basic Course	312, 313	Problems
1, 2	Senior Technical Mathematics	12, 13	"

After you have written Item Progress Check XII E, Form 1, and have meet the criterion, you are ready to write Unit XII Progress Test, Form 1. If you meet the criterion on Unit XII Progress Test, you have completed Unit XII and may select an additional math option if you wish. If you do not meet the criterion on the Unit Progress Test, see your instructor.

If you do not meet the criterion on Item Progress Check XII E, Form 1, select additional work from the above table and, after completing it, write Item Progress Check XII E, Form 2. If you do not meet the criterion, see your instructor.

If you meet the criterion on the Item Progress Check, you are ready to write Unit XII Progress Test, Form 1. If you meet the criterion on Unit Progress Test XII you have completed Unit XII and may select an additional math option if you wish. If you do not meet the criterion on the Unit Progress Test, see your instructor.

Mathematics Item Progress Check

UNIT XII: INTRODUCTORY ALGEBRA Name: _____

ITEM E: PROBLEM SOLVING Date: _____

Form 1

Criterion:	15 / 16
Score:	___/___

Problems: In the space below, show the work you do to solve problems. One mark is for naming the variable or variables, one mark is for making an equation, one mark is for solving the equation and one mark is for answering the question.

(4) 1. If the sum of three consecutive whole numbers is fifty-four, what are the numbers and what is the algebraic equation required to solve this problem?

(4) 2. One half of a certain number less three is nine. What is the number? Show your algebraic solution.

(4) 3. If a person had a total of two dollars and ninety cents, which consisted of 3 nickels, 5 dimes, and the remainder in quarters. How many quarters did he have? Show your algebraic solution.

(4) 4. During the summer, darkness is six hours less than daylight. How many hours of darkness are there on this particular day? Show your algebraic solution.

Mathematics Item Progress Check

UNIT XII: INTRODUCTORY ALGEBRA Name: _____

ITEM E: PROBLEM SOLVING Date: _____

Form 2

Criterion:	14 / 16
Score:	___ / ___

Problems: In the space below, show the work you do to solve problems. One mark is for naming the variable or variables, one mark is for making an equation, one mark is for solving the equation and one mark is for answering the question.

(4) 1. If one is subtracted from three times a certain number, the result is 20. What is the number and what is the algebraic equation required to solve this problem.

(4) 2. The sum of four consecutive integers is 98. What are the integers? Show your algebraic solution.

(4) 3. Suppose there are twice as many dimes as nickels in a box and the number of quarters is equal to the number of nickels. If the total value of the coins is $4.50, how many of each coin are there? Show your algebraic solution.

(4) 4. There are 15 students in a class. If there were 3 fewer men than women, how many men were there? Show your algebraic solution.

Mathematics Unit Progress Test

Unit XII: Introductory Algebra Name: _____

Form 1 Date: _____

Criterion: 40 / 44
Score: ___/___

(1) 1. Give an example of a mathematical sentence which contains a variable and a constant. Put v under the variable and c under the constant.

_____

(2) 2. a. Give an example of a term.

_____

b. Give an example of an expression with 2 terms.

_____

(4) 3. Identify each of the following as being a monomial, a binomial or a trinomial.

a. $a + b$ _____

b. $\frac{3ab}{2}$ _____

c. $\frac{1}{5}(x + y)$ _____

d. $ax^2 + bx + c$ _____

(10) 4. Do these.

a. $(a + b) + (2a + 3b - c) =$ _____

b. $(x + y - z) - (x - y + z) =$ _____

c. $a + 2a + 5a =$ _____

d. $5ab + 4ac - 3ab =$ _____

e. Add. $\begin{array}{r} 7a + b \\ \underline{3a + 2b + c} \end{array}$

f. Subtract. $\begin{array}{r} x + y \\ \underline{-x + 2y + 2z} \end{array}$

g. $\frac{2x + 6y}{2} =$ _____

h. $\frac{2x + 10xy}{2x} =$ _____

i. $(x + y)(x - y) =$ _____

j. $\frac{x^3y + x^2y^2 + xy^3}{x} =$ _____

(4) 5. Evaluate these expressions when a = 2, b = 3, c = -4.

a. ab = _____

b. $\frac{a + b}{b - a} =$ _____

c. a + b + 2c = _____

d. 2(a + c) = _____

(3) 6. Write open sentences for the following.

a. 5 times the sum of x and 3 is 15

_____

b. The difference of x and y is 8.

_____

c. $\frac{2}{5}$ of x is 10. _____

(5) 7. Solve these. Show your work

a. x + 4 = 6 x = _____

b. 2x - 3 = 13 x = _____

c. $5a + 5 = 3a - 1$ $a =$ _____

d. $\frac{2}{3}(x - 3) = 4$ $x =$ _____

e. $2x = \frac{1}{2}$ $x =$ _____

(2) 8. How long will it take to go 450 miles at an average speed of 35 miles per hour? (use d = rt) Show your work. One mark is for your work and one mark is for the correct answer.

(2) 9. What is the interest on $190.00 for six months at 3% annual interest? (use I = prt) Show your work. One mark is for your work and one mark is for the correct answer.

(2) 10. Given the relation $I \text{ (amps)} = \frac{V \text{ (volts)}}{R \text{ (resistance)}}$, calculate the volts required to cause 11 amps to flow through an appliance of ten ohms resistance. Show your work. One mark is for your work and one mark is for the correct answer.

(5) 11. Simplify. Show your work

a. $\frac{a^2b}{b} =$ _____

b. $(a^2b^2)^2 (a^2) =$ _____

c. $(x^2y)^2 (x^0) =$ _____

d. $a^3 + a^5 =$ _____

e. $(5a^2)^3 =$ _____

Problem: In the space below, show the work you do to solve problems. One mark is for naming the variable or variables, one mark is for making an equation, one mark is for solving the equation and one mark is for answering the question.

(4) 12. A man paid $17.24 for a sweater and a tie. If the sweater cost 3 times as much as the tie, how much did the tie cost?

Mathematics Unit Progress Test

UNIT XII: INTRODUCTORY ALGEBRA Name: _____

Form 2 Date: _____

Criterion:	26 / 30
Score:	___/___

(2) 1. In 5a the variable is _____ and the constant is _____.

(4) 2. Identify each as being a monomial, a binomial or a trinomial.

a. 2 _____

b. $3a + 6 =$ _____

c. $\frac{4a + b}{2} =$ _____

d. $a^2 + 2ab + b^2 =$ _____

(4) 3. Do these.

a. $(x + y) - 2x + 3y - 3x =$ _____

b. $(a + b) - (a - b) =$ _____

c. Add. $\begin{array}{r} 6a - b + c \\ \underline{2a \quad\quad + 3c} \end{array}$

d. Subtract. $\begin{array}{r} 7a \\ \underline{9a - b} \end{array}$

(3) 4. Evaluate these expressions when $x = 5$, $y = -2$, and $z = 4$.

a. $\frac{x + y}{z} =$ _____

b. $xyz =$ _____

c. $\frac{y}{z} =$ _____

(3) 5. Write open sentences for these.

a. The product of 3 and x is 12.

_____

b. One half the sum of 'a' and a number is 8.

_____

c. Two consecutive numbers total 23.

_____

(4) 6. Solve.

a. $5a - 5 = 30$ _____

b. $1.5a = 75$ _____

c. $\frac{1}{5}(x - 5) = 5$ _____

d. $8x + 5 = 3x$ _____

(2) 7. What is the width of a rectangle which has a perimeter of 42 inches and a length of 14 inches? (use $P = 2L + 2W$) Show your work. One mark is for your work and one mark is for the correct answer.

(2) 8. How long is the base of a triangle of 28 sq. in. area and a height of 7 in.? Show your work. One mark is for your work and one mark is for the correct answer. Use the formula $A = \frac{1}{2}bh$

(2) 9. Simplify

a. $(x^0)^2 (xy)^3$ _____

b. $\frac{a^2(bc^2)^3}{abc}$ _____

Problem: In the space below, show the work you do to solve problems. One mark is for naming the variable or variables, one mark is for making an equation, one mark is for solving the equation, and one mark is for answering the question.

(4) 10. A lady paid a bill of $2.80 with quarters and dimes, using the same number of **each** coin. How many dimes did she use? Answer the question by writing a sentence showing how the parts are related, then writing an open sentence using the variables for the unknown, and finally solving for the unknown.

MATHEMATICS

UNIT XIII: USING COMPUTATIONAL DEVICES

There are no Diagnosis, Item Progress Checks or Unit Progress Tests for this Unit. This Unit is completely optional --- you need only do the parts that interest you or that you may find useful. You start this Unit by selecting the appropriate Objectives/Learning Activities sheet and learn each Objective by completing the materials listed in the Learning Activities. Item A is on powers and roots, Item B is on log tables and Item C is on the slide rule.

This is the last Unit in the Mathematics programme. If you have any difficulties - see your instructor.

MATHEMATICS

UNIT XIII: USING COMPUTATIONAL DEVICES

ITEM A: POWERS AND ROOTS

Do the work listed for each objective and check off each step as you complete it.

OBJECTIVES

The student must be able to:

1. Define squaring a number by using an example such as 3 squared means 3 x 3 and square given numbers.
2. Use exponential notation for writing squares (i.e., $a^2 = a \times a$)
3. Use tables of powers to square given numbers.
4. Define square root by using an example such as the square root of 9 means 3 because 3 x 3 = 9 and write square roots of perfect squares to 144.
5. Use tables of roots to determine the square roots of perfect squares to 144.
6. Use tables of roots to determine the square root of given numbers.

LEARNING RESOURCES

Books: Refresher Mathematics, Stein
Mathematics, A Basic Course, Cambridge Book Company
General Mathematics, Ginn and Company

LEARNING ACTIVITIES

Read page 256 in Refresher Mathematics and do 5 questions each in sets 1, 3 and 5 on page 257. Check your answers with those in the back of the book. Then do "practical applications" problem 1(a-e) on page 257. Check your answers. Next, read pages 258 to 260. Do the odd numbered questions in the Diagnostic Test on page 260. Check your answers. Do sets in the "related practice examples" on page 260 and 261 which correspond to the questions you missed in the Diagnostic Test (for example, if you missed question 3, do set 3 as an exercise). Check your answers.

Read the bottom of page 261, all of 262 and the top of page 263. Then do "practice problems" a,c,e,g,k,m and o on page 263. Check your answers. Also do "practical applications" question 1 (a-d). The table of powers and roots is located on page 581.

Additional information may be found in Mathematics, A Basic Course on pages 351 to 354 and in General Mathematics on page 9, pages 116 to 122 and on page 470.

This completes Item A.

MATHEMATICS

UNIT XIII: USING COMPUTATIONAL DEVICES

ITEM B: LOG TABLES

Do the work listed for each objective and check off each step as you complete it.

OBJECTIVES

The student must be able to:

1. Use scientific notation to express in writing any given number.
2. Define the Laws of indices, and be able to apply them.
3. Define numbers as powers and logarithms
4. Express numbers as logarithms and logarithms as numbers
5. Use logarithms in computations

LEARNING RESOURCES

Book: Senior Technical Mathematics, Heywood

LEARNING ACTIVITIES

This information is found in Senior Technical Mathematics and starts with "indices" on page 115. Read from page 115 to 145 and do some of the exercises. Log tables are located on pages 488 to 491.

This completes Item B.

MATHEMATICS

UNIT XIII: USING COMPUTATIONAL DEVICES

ITEM C: SLIDE RULE

Do the work listed for each objective and check off each step as you complete it.

OBJECTIVES

The student must be able to:

1. Identify by name the physical components of the slide rule.
2. Read and find numbers accurate to 3 significant figures (rounded off to 3 figures) on the A,B,C,D and K scales on the slide rule.
3. Calculate the product of 2 or more factors accurate to 3 significant figures using the C and D scales.
4. Calculate the quotient of a division question accurate to 3 significant figures using the C and D scales.
5. Calculate accurate to 3 significant figures questions involving both multiplication and division using the C and D scales.
6. Calculate the square of a number accurate to three significant digits using the C and A scales.
7. Calculate the square root of a number accurate to three significant figures using the A and C scales.
8. Calculate the cube of any number accurate to three significant digits using the C and K scales.
9. Calculate the cube root of any number accurate to three significant digits using the K and C scales.
10. Solve problems involving multiplication, division, squares, cubes, square roots and cube roots accurate to three significant figures using the A,C,D and K scales.

LEARNING RESOURCES

Books:	Learn Basic Slide Rule on Your Own, Hughes-Owens Senior Technical Mathematics, Heywood
Aid:	Slide rule

LEARNING ACTIVITIES

This information is found in the book "Learn Basic Slide Rule on Your Own". You will also need a slide rule (get one from your instructor). Turn to page 1 and read the table of contents. Then read the Forward on page 2 and the Introduction on page 3. It is important that you follow the directions on page 3 and turn to the page mentioned at the bottom of the page you are reading. The pages are not read in numerical order. If you are having difficulties, see your instructor. Additional information may be found in the book Senior Technical Mathematics on pages 146 to 180.

This completes Item C and also the unit on Using Computational Devices.

Communications Diagnosis

UNIT I: WORKING WITH WORDS

NAME: _____

DATE: _____

S.I.N. No. _____

Section A: Answer the following questions.

Schooling:

What grade did you last complete in school? _____

Where? _____

How many years ago? _____

Have you taken any training or courses since then? _____

Describe these briefly. _____

_____

_____

Language:

What was the first language you learned? _____

If other than English, how long have you been speaking English? _____

How long have you been writing English? _____

What other languages do you speak? _____

Have you any difficulty understanding what you are reading? when you read a newspaper? _____

Do you subscribe to, or regularly buy a newspaper? _____

About how much time do you spend reading books or magazines during a week? _____

Other:

What jobs have you held recently? List them.

_____

_____

_____

_____

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What do you want to do after completing this course? Outline your plans briefly. _____

_____

_____

_____

Section B: Write the plural forms of each of the following words If the word is already plural, write P in the blank.

1. ditch _____
2. nephew _____
3. deer _____
4. city _____
5. bus _____
6. pants _____
7. child _____
8. phantom _____
9. church _____
10. radio _____
11. wolf _____
12. fox _____
13. spy _____
14. lamb _____
15. step-brother _____
16. tomato _____
17. tray _____
18. life _____
19. saucer _____
20. news _____

Section C: Write contractions for these words.

1. they had _____
2. it has _____
3. I would _____
4. he is _____
5. are not _____
6. I have _____
7. will not _____
8. who will _____

Write the words that these contractions are formed from.

9. we'll _____
10. wasn't _____
11. they're _____
12. shouldn't _____
13. doesn't _____
14. it's _____
15. I'd _____
16. who's _____

Write abbreviations for these words.

17. ounce _____
18. Newfoundland _____
19. government _____
20. tablespoon _____
21. delivery _____
22. June _____
23. doctor _____
24. street _____

Write the words that these are abbreviations for.

25. N.D.P. _____
26. Tues. _____
27. m.p.h. _____
28. e.g. _____
29. doz. _____
30. incl. _____
31. Feb. _____
32. Ltd. _____

Section D: Write the prefix (if any), root word and suffix (if any) for each of the following words.

		Prefix	Root Word	Suffix
example:	*unsinkable*	*un*	*sink*	*able*
1.	impressed			
2.	ineffective			
3.	reliable			
4.	independent			
5.	removed			
6.	exploration			
7.	recycle			
8.	unhappy			
9.	helpful			
10.	deform			
11.	repaid			
12.	slowest			

Add a prefix or suffix to the underlined word, so that it makes sense in the sentence. Write the complete word in the blank at the right.

13. It is *wise* to drive after you have been drinking.(_____)
14. I have been on my own and quite *dependent* for four years.(_____)
15. He was *satisfied* with the poor quality of his purchase.(_____)
16. A dull knife is *use* on a hunting trip. (_____)
17. He was very *care* to do his work correctly. (_____)
18. Tom is *short* than Bill. (_____)
19. George paid the money that we had *loan* him. (_____)
20. Mary is the *happy* girl in that group. (_____)

Section E: Write a synonym for each of these words.

1. correct _____
2. silent _____
3. huge _____
4. find _____
5. spent _____
6. nervous _____

Write an antonym for each of the following.

7. whisper _____
8. angry _____
9. frigid _____
10. timid _____
11. risky _____
12. temperamental _____

In the space provided, write a synonym for the underlined word, to fit the context of the sentence.

13. The snow had already *melted*, but the ice on the lake had not begun to _____.
14. A *toboggan* is a kind of _____.
15. This *exam* is not the last _____you will write.
16. Her favorite *perfume* is the _____of lilies.

In the space provided, write an antonym for the underlined word, to fit the context of the sentence.

17. The main highway was *straight*, but the back roads were _____.
18. The *old* man spoke quietly to his _____ son.
19. Somedays, you have only *started* your work when it's time to _____for the day.
20. The principal *allowed* us only one field trip; he _____ the others we had planned.

Circle the correct homonyms in each sentence below.

21. We went walking (threw, thru, through) the woods.
22. We got caught in a (reign, rain, rein) storm.
23. Almost (to, too, two) hours (passed, past, paste) before we could go home.
24. There were (to, too, two) many people in the line up.
25. (Who's, Whose) going to the baseball game?

In the following paragraph, circle the incorrect homonyms that are used. Write the correct homonyms (in order) on the spaces at the right.

It is a good idea too have sum idea of the kind of job you wood like. You can choose coarses that will aide you in preparing fore you're employment. You will also know wear to look and witch ads to answer. When you have the chance, you will go into an interview knowing weather or knot you will succeed.

Communications

UNIT I: WORKING WITH WORDS

ITEM A: BASIC ENGLISH

OBJECTIVES

The student must be able to:

1. Read and write English at a level necessary for beginning Level II-III training.

LEARNING RESOURCES

Books: Basic Reading Skills Workbook
Basic Reading Skills, Teacher's Edition (answer key)

Cassette Tapes: Set A Word Study - tapes to accompany Basic Reading Skills

Acetate sheets and felt pens

LEARNING ACTIVITIES

For your work in this Item you will use the Basic Reading Skills workbook, together with a set of cassette tapes. Do two or three tapes each day, together with the related Workbook assignments. The Item is finished when you have completed to page 58 and tape 32.

Begin by reading pages 4 to 6 in the workbook. Begin tape 1 when you are ready to start on page 7.

When you do the workbook exercises, place the acetate (plastic) sheet over the page, and fill in the blanks, writing on the sheet with a felt pen. When you have completed and corrected your exer-

cise, wipe the sheet clean with a damp paper towel. Use only the pens provided (others may not erase), and do not mark the workbook.

Since you do six "Check Yourself" exercises in this Item as you go through it, there is no Item A Progress Check at the end. Go directly on to the next required Item in Unit I.

Communications

UNIT I: WORKING WITH WORDS

ITEM B: PLURALS

OBJECTIVES

The student must be able to:

1. Write and use singular and plural forms of words for which the plural is made by adding 's' or 'es'.
2. Write and use singular and plural forms of words, in cases where the spelling is altered before adding 's' or 'es'.
3. Write and use singular and plural forms of common words for which the plural is not formed in standard ways.

   eg: child; children ox; oxen
   mouse; mice man; men

4. Write and use words in which singular and plural forms are the same.

   eg: deer trout
   scissors sheep

5. Write and use singular and plural forms of hyphenated words.

   eg: son-in-law , sons-in-law
   step-brother , step-brothers

Learning Resources

Basic English Review (and answer key)
English II
English III
Mastering Parts of Speech (and answer key)
Work-A-Text in English I and 2
Acetate sheets and felt pen

LEARNING ACTIVITIES

1. Read over the objectives for this item. Think of examples for each objective. Now, turn to page 31 of Basic English Review and read over the rules given there. Make brief notes on the rules and exceptions given.

2. Do the exercise (Practise 19) on page 33 of Basic English Review. Do this without looking at the rules and mark your work.

3. If you got 45 or more correct on the exercise, go on to Item Progress Check I B - Form 1. If not, reread the rules, check each of your mistakes to find out which rule you should have used and do the exercise on page 34 (Practise 20) of Basic English Review. When you have marked this exercise go on to Item Progress Check I B - Form 1.

A score the same as, or greater than, the criterion means that you can move on to the next Item. A score that is less than the criterion indicates that more work is needed.

4. This additional work must be handed in, stapled to Item Progress Check I B - Form 2. This Item Progress Check must not be done until the following is ready to hand in. First take Mastering Parts of Speech and do the exercises on page 3 and 4. When you have marked these go on to the section entitled "Plurals" on page 67-68 of English II. Check the exercise from this book with the dictionary. Following this do the section entitled "Plurals of Nouns" on page 64-67 of English III. Again, check your answers with the dictionary.

You should now be ready to write Item Progress Check I B - Form 2. Reread the objectives and, if you are certain you can do them, write the check. Do not forget to staple your previous work to the check. If you do not feel ready for this test, go to the section on "Plurals" in Work-A-Text in English I (page 20) and Work-A-Text in English 2 (page 12).

Communications Item Progress Check

UNIT I: WORKING WITH WORDS Name: _____

ITEM B: PLURALS Date: _____

Form 1

Criterion: 28/ 30

Score: ___/ 30

(20) 1. Write the plural form of each of the following words. If the word is already plural, write P in the blank.

a. tray _____
b. paint _____
c. women _____
d. party _____
e. roof _____
f. dormouse _____
g. dish _____
h. crowd _____
i. Eskimo _____
j. bush _____
k. bus _____
l. funny _____
m. child _____
n. trout _____
o. potato _____
p. on-looker _____
q. city _____
r. cattle _____
s. wife _____
t. scissors _____

(10) 2. Circle the correct form of the word in brackets, to fit the context of the sentence.

a. We took four (coat, coats, coates) to the dry cleaners.

b. Six pounds of (tomato, tomatos, tomatoes) are needed for that recipe.

c. My (sister-in-law, sisters-in-law, sister-in-laws) both came to stay last week.

d. He trained his dog to help herd (sheep, sheeps, shep).

e. The employer wanted to hire three (doorman, doormen, doormans).

f. f. The vet came to clean the animals' (hoof, hoofs, hooves).

g. He got the job of tuning all of the (pianos, pianoes, piano) in the concert hall.

h. They enjoyed watching the (monkey, monkies, monkeys) playing together.

i. There are many interesting (fact, facts, factes) to be found in an almanac.

j. There were three different kinds of (fish, fishs, fishes) in the aquarium.

Communications Item Progress Check

UNIT I: WORKING WITH WORDS Name: _____

ITEM B: PLURALS Date: _____

Form 2

Criterion:	26 /30
Score:	___/30

(20) 1. Write the plural forms of each of the following words. If the word is already plural, write P in the blank.

a. fly _____ k. bison _____

b. brush _____ l. church _____

c. life _____ m. process _____

d. donkey _____ n. fisherman _____

e. fox _____ o. wolf _____

f. enemy _____ p. cooky _____

g. ditch _____ q. alley _____

h. hero _____ r. leaf _____

i. spoonful _____ s. child _____

j. belief _____ t. factory _____

(10) 2. Circle the correct form of the word in brackets, to fit the context of the sentence.

a. Help yourself; you may take as many as three (handfuls, handsful, handful).

b. This game needs two (dice, dices, die).

c. I sent my (scissor, scissors, scissores) to be sharpened

d. The (ladys', ladies', ladyes') department is near the back of the store.

e. The (cattle, cattles) were left to graze.

f. They had to raise the (ceiling, ceilings, ceilinges) in all the rooms.

g. His twin (step-brothers, steps-brother, steps-brothers) were a handful to look after.

h. The dentist pulled three (teeth, toothes, tooths) at the same time.

i. The (army, armies, armys) of those (countries, country, countrys) had a brief skirmish at the border.

COMMUNICATIONS

UNIT I: WORKING WITH WORDS

ITEM C: CONTRACTIONS AND ABBREVIATIONS

OBJECTIVES

The student must be able to:

1. Identify and use contractions correctly.
2. Rewrite contractions as the two contracted words.
3. Identify and use abbreviations correctly.
4. Write the long form of common abbreviations.

LEARNING RESOURCES

Basic English Review and answer key
Basic Skills in Grammar I and answer key
English II and III
English Workshop 9 and answer key
Mastering Capitalization and Punctuation and answer key
Acetate (plastic) sheets and felt pens

LEARNING ACTIVITIES

1. You will begin this item by working on contractions. Read the notes on "Forming Contractions" on page 104 of Basic Skills in Grammar I. Study carefully the list of contractions given. In each case, find out what words the contraction was formed from. Then, do exercise D on page 105 of the same book. Check your work.

2. Read page 106 of Basic Skills in Grammar I and study the lists of abbreviations given on page 107. Do exercises A and B on page 107-108. Mark your work. If you did not make more than two mistakes in each exercise, go on to Item Progress Check I C, Form I. If you made two or more mistakes on the exercises, restudy the assignment until you

can do all the work correctly. Then go on to Item Progress Check I C, Form 1.

3. If you did not make the criterion on the Item Progress Check, do the following exercises. (Make sure you do your work in your notebook, you must hand it in when you finish the Item.) For work on contractions, do the exercises on pages 47-48 of Mastering Capitalization and Punctuation. For work on abbreviations, use Mastering Capitalization and Punctuation, pages 17-18. Check your work and correct any errors. See your instructor about doing Item Progress Check I C, Form 2. He may ask you to show him your completed assignment.

If you think that you need more work, before going on to the Item Progress Check, do the following exercises until you have mastered the objectives.

English Workshop 9, page 137-138
English II page 66-67
English III page 33-35

Staple all your completed assignments to the Item Progress Check I C, Form 2, when you hand it in for correcting.

Communications Item Progress Check

UNIT I: WORKING WITH WORDS Name: _____

ITEM C: CONTRACTIONS AND ABBREVIATIONS Date: _____

Form 1

Criterion:	37/ 40
Score:	___/ 40

(10) 1. Write the contractions for the following:

a. it is _____ f. will not _____

b. let us _____ g. it would _____

c. must not _____ h. should not _____

d. we will _____ i. John is _____

e. they had _____ j. who is _____

(8) 2. Write the words that these contractions are formed from:

a. you'll _____ e. I'm _____

b. can't _____ f. don't _____

c. he'd _____ g. 'twas _____

d. they're _____ h. could've _____

(12) 3. Circle the words that can be abbreviated in the paragraph below. On the lines to the right, write the abbreviations.

On Tuesday, January 5, I had to go for a job interview with the Karlson Kandy Company. They needed a person to work in the stock department in their new building. I showed them my resume, listing personal data such as address, telephone number, Social Insurance Number, height and weight. I had also listed my previous experience in stock work for Harley Hawes Limited. I got the job !

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____

(10) 4. Write in full the word or words that each of these abbreviations stand for.

a. incl. _____ f. M.L.A. _____

b. B.C. _____ g. lb. _____

c. misc. _____ h. e.g. _____

d. P.S. _____ i. ave. _____

e. yr. _____ j. R.S.V.P. _____

Communications Item Progress Check

UNIT I: WORKING WITH WORDS Name: _____

ITEM C: CONTRACTIONS AND ABBREVIATIONS Date: _____

Form 2

Criterion: 35/40

Score: ___/40

(8) 1. In the following paragraph, circle the words that could be contracted. On the lines to the right of the paragraph write the contractions.

When we are on the way, I will tell you about our destination. It would ruin the surprise if I told you now. You must not know too much, but I am going to tell you that we will be there in about an hour, and you will not be sorry that you have come.

_____ _____
_____ _____
_____ _____
_____ _____

(10) 2. In the following paragraph, circle the words that are contractions and, on the lines to the right of the paragraph, write the words from which the contractions are made.

I'm going out this evening, to look at John's motorcycle. He's been trying to sell it, and has found some people who'll buy it. They're interested in having someone else there who's ridden it and isn't trying to sell it. I haven't figured out why; as a friend of John's, I'd like to help him sell it, but that's alright with them. They say it won't matter.

_____ _____
_____ _____
_____ _____
_____ _____
_____ _____

(12) 3. Write the abbreviations for the following expressions.

a. for example _____ g. feet _____

b. senior _____ h. Newfoundland _____

c. number _____ i. advertisement _____

d. miscellaneous _____ j. company _____

e. quart _____ k. in care of _____

f. afternoon _____ l. Saturday _____

(10) 4. Write the complete expression for each of the following abbreviations.

a. M.P. _____ f. acct. _____

b. etc. _____ g. m.p.h. _____

c. oz. _____ h. Tues. _____

d. pd. _____ i. in. _____

e. Alta. _____ j. C.B.C. _____

COMMUNICATIONS

UNIT I: WORKING WITH WORDS

ITEM D: PREFIXES AND SUFFIXES

OBJECTIVES

1. Identify common prefixes and suffixes in given examples of words in which they are used.

2. State how common prefixes and suffixes alter the meaning of a word, as in these examples-

   un - usually means not -- eg. unhappy

   re - usually means back or again -- e.g. repaid

   er - usually means more (comparing) -- eg. heavier

3. Add a correct prefix and/or suffix to a given word, for use in the context of a sentence. (Spelling must be correct.)

4. Write the root word by removing the prefix and/or suffix.

5. Identify the prefix, suffix, and root word in given examples.

LEARNING RESOURCES

Basic Reading Skills - workbook and tapes and answer key
Better and Faster Reading - textbook and answer key
English II and III
English Workshop 9 and answer key
Increase Your Vocabulary I and 2 and answer key
Acetate (plastic) sheets and felt pen

LEARNING ACTIVITIES

1. Begin work on this section by listening to the Basic Reading Skill Tapes number 12-17 and using the workbook, page 24-32. Don't do more than 2 tapes per day. Mark your work after each exercise.

2. Read page 30-35 in Increase Your Vocabulary I, paying special attention to the lists of prefixes and suffixes and their meanings. Do the exercises on page 36 of that book and mark your work.

3. Then, go back to the Basic Reading Skills tapes and do tapes number 18 and 19, with page 33-34 as a review.

Mark your work; if you made less than 2 mistakes, you are ready for the Item Progress Check I D, Form I. Remember to check with your instructor before doing it. If you made more than two mistakes, reread and review the work you've done in this Item, before going on with the Item Progress Check.

4. If you did not make the criterion on the Item Progress Check, you will continue your work using Increase Your Vocabulary 2. Read page 18-24, paying careful attention to the lists of frequently used prefixes and suffixes on page 21-23. Then, do the exercises on page 24-25.

Mark your own work, paying apecial attention to your mistakes. You should be ready for Item Progress Check I D, Form 2, but if you are not, use some of the following exercises for more practice.

Better and Faster Reading	page 68-75
English II	page 59-63
English III	page 78-84
Increase Your Vocabulary I	page 31-36

When you are ready, see your instructor for Item Progress Check I D, Form 2. Remember to hand in the work you've done on this Item, with the Form 2 test.

Communications Item Progress Check

UNIT I: WORKING WITH WORDS Name: _____

ITEM D: PREFIXES AND SUFFIXES Date: _____

Form 1

Criterion:	23 /25
Score:	___/ 25

(10) 1. Write the prefix (if any), root word and suffix (if any) of each of the following words. (Use the space provided)

		Prefix	Root Word	Suffix
a.	joyous	_____	_____	_____
b.	untanned	_____	_____	_____
c.	busiest	_____	_____	_____
d.	repayment	_____	_____	_____
e.	disarranged	_____	_____	_____
f.	inexcusable	_____	_____	_____
g.	truthfulness	_____	_____	_____
h.	unhappily	_____	_____	_____
i.	moveable	_____	_____	_____
j.	unimpressed	_____	_____	_____

(5) 2. Underline the prefix or suffix in the following words, and briefly state the meaning of the complete word.

a. careful _____

b. misspell _____

c. midnight _____

d. harmless _____

e. unhappy _____

(10) 3. Add a prefix and/or suffix to the underlined word, so that it fits the context of the sentence. Write the new word correctly on the space to the right.

a. The boys were <u>pleased</u> when they had to come home from their fishing trip without any fish. _____

b. A couger is usually <u>noise</u> when it stalks its prey _____

c. Ed's socks were <u>matched</u>: they were of different colours. _____

d. The water is <u>shallow</u> in the part beside the rapids. _____

e. You can get a ticket if you park in that <u>legal</u> zone. _____

f. He wrote a note to <u>mind</u> him of his appointment. _____

g. They met at the <u>appoint</u> hour. _____

h. That new model is quite a <u>differ</u> car. _____

i. It was a <u>comfort</u> thought to know they were safe. _____

j. He had <u>look</u> the most important point. _____

Communications Item Progress Check

UNIT I: WORKING WITH WORDS Name: _____

ITEM D: PREFIXES AND SUFFIXES Date: _____

Form 2

Criterion:	21/25
Score:	___/25

(10) 1. Fill in the chart with the prefixes and/or suffixes and root words of the words on the left.

	Prefix	Root Words	Suffix
a. agreeable			
b. postdate			
c. unthinkable			
d. reference			
e. maladjusted			
f. reactionary			
g. misinterpret			
h. international			
i. beautiful			
j. bypassing			

(5) 2. Underline the prefix or suffix in the following words, and briefly state the meaning of the complete word.

a. tasteless _____

b. impure _____

c. happiest _____

d. uncertain _____

e. semicircle _____

(10) 3. Add a prefix or suffix to the underlined word, to fit the content of the sentence. Write the new word in the space to the right.

a. He showed his wise by giving a thoughtful answer. _____

b. The train stood mobile while the track was repaired. _____

c. John walked through the door, into the dine room. _____

d. He made a revise of his essay after proofreading it. _____

e. He sent for a subscribe to that magazine. _____

f. Be careful to write legible. _____

g. We had a quarrel, which made the whole evening very pleasant. _____

h. I've always been the short person in the class. _____

i. They began work on construction of the buildings that were ruined by the fire. _____

j. You should be careful not to spell words when you write. _____

COMMUNICATIONS

UNIT I: WORKING WITH WORDS

ITEM E: SYNONYMS, ANTONYMS, HOMONYMS

OBJECTIVES

The student must be able to:

1. Define synonyms, antonyms and homonyms.
2. Write and use synonyms for given words, including examples of writing a synonym to fit the context of a sentence.
3. Write and use antonyms for given words, including writing antonyms to fit the context of a sentence.
4. Select and use proper homonyms according to sentence context.
5. Proofread and correct errors in homonym usage in a given sentence or paragraph.

LEARNING RESOURCES

Basic English Review and answer key
Basic Reading Skills workbook and answer key
English II and III
English Workshop 9 and answer key
Mastering Good Usage and answer key
Increase Your Vocabulary I and 2 and answer key
Acetate sheets and felt pens

LEARNING ACTIVITIES

1. Start your work for this Item on page 24 of Increase Your Vocabulary I. Read the notes on page 24-26 until you are sure of the definitions of synonyms, antonyms and homonyms. Think of examples (other than those given) of each type of word pair. Then, do the exercises on pages 27-29 of Increase Your Vocabulary I. Do also the exercises on page 22-23 of that book. Mark your work. If you scored 2 or less mistakes on each exercise, you are ready for the Item Progress Check. If not, review this section and study the word lists on page 14-21. Review the exercises, redoing them if necessary. Now, go on to Item Progress Check I E, Form 1.

If you did not make the criterion on the test, you need more work. Examine your mistakes. If for example, you got all questions on synonyms correct, you need not do the synonym work, but if you made any errors on that section, do the work outlined. Your instructor may help you assess your difficulties.

2. For work on synonyms, read page 34-35 of Increase Your Vocabulary 2. Study the synonym lists on page 35 and 37. Then, do the exercises on page 36 and 38. Mark your own work. If you need further review, do the appropriate pages listed for supplementary work.

3. For a review of antonyms, use Increase Your Vocabulary 2, read page 32 and do the exercises on page 33. Mark your work. If you are still confused about antonyms, do the appropriate pages listed as supplementary work.

4. For more work on homonyms, begin on page 26 of Increase Your Vocabulary 2. Read page 26-32, doing the exercises given. Study the list of homonyms on page 27-31 and copy the pairs that you are not familiar with as well as those you make mistakes with. Use each problem word in a sentence. If you need more review, do the appropriate supplementary work.

5. You should now be ready for Item Progress Check I E, Form 2. If so, see your instructor to do it. If not, do exercises from the following list, until you feel you have mastered the objectives.

Basic English Review	page 197-200 (some homonyms)
Basic Reading Skills	page 99-100 (antonyms & synonyms)
English II	page 55-58 (synonyms, antonyms, homonyms)
English III	page 88-91 (synonyms, antonyms, homonyms)
English Workshop 9	page 61-62 (synonyms)
Mastering Good Usage	page 35-37, (homonyms) 40-43

Do all your work in your notebook and attach it to the Item Progress Check I E, Form 2, which you are now ready to do.

Communications Item Progress Check

UNIT I: WORKING WITH WORDS Name: _____

ITEM E: SYNONYMS, ANTONYMS AND HOMONYMS Date: _____

Form 1

Criterion:	23 / 25
Score:	___ / 25

(8) 1. Write a synonym and an antonym (in the spaces provided) for the word on the left.

		Synonym	Antonym
a.	finish	_____	_____
b.	unhappy	_____	_____
c.	under	_____	_____
d.	terrible	_____	_____
e.	work	_____	_____
f.	quickly	_____	_____
g.	courage	_____	_____
h.	falling	_____	_____

(4) 2. Write a synonym for the underlined words, to fit the content of the sentence. Put the word in the space to the right.

a. The police are very <u>severe</u> with drivers who drink. _____

b. The work crew spent ten hours a day to get the house <u>built</u> by winter. _____

c. Frequent brushing will make your hair <u>shiny</u>. _____

d. Don't <u>hesitate</u>, you'll take longer to get the work done. _____

(4) 3. Write an antonym for the underlined word, to fit the content of the sentence. Put the word in the space to the right.

a. That essay should be <u>lengthened</u>. _____

b. He's a very <u>active</u> student. _____

c. I've never met such a <u>friendly</u> person. _____

d. Is that bridge <u>safe</u> to walk on. _____

(1) 4. What is a homonym? _____

_____

(8) 5. In the following sentences, circle the errors in homonym usage. Use the spaces provided to write the correct homonyms, in order.

a. The some total of there work was done before you arrived. _____ _____

b. Wood you ever ride a camel across a dessert _____ _____

c. He had to alter the breaks on the car. _____

d. This is an interesting coarse; I've been taut a lot of things. _____ _____

e. When where those books banned? _____

Communications Item Progress Check

UNIT I: WORKING WITH WORDS Name: _____

ITEM E: SYNONYMS, ANTONYMS, HOMONYMS Date: _____

Form A

Criterion:	21 / 25
Score:	___ / 25

(1) 1. What is a synonym? _____

_____

(1) 2. What is an antonym? _____

_____

(8) 3. Write a synonym and an antonym for each of the following words.

		Synonym	Antonym
a.	cheerful	_____	_____
b.	blunt	_____	_____
c.	healthy	_____	_____
d.	fearless	_____	_____
e.	vacant	_____	_____
f.	destroy	_____	_____
g.	hesitate	_____	_____
h.	polite	_____	_____

(10) 4. Circle the correct homonym from those given in brackets, to fit the content of the sentence.

a. The school (principal, principle) called a staff meeting.

b. The (personal, personnel) officer is the man who does the hiring for our firm.

c. (There, Their) is a special meeting of the town (counsel, council) tonight.

d. They were trying (to, too, two) decide if they should let (miners, minors) vote.

e. Alderman Taylor set (forth, fourth) a motion to allow the young people to vote.

f. He also (lead, led) discussion of the problem.

g. They decided to (wait, weight) and run a survey to determine (whether, weather) there was enough interest in voting.

(5) 5. Write a homonym for each of the words given, and use the homonym (you wrote) in a sentence.

a. course _____

b. sight _____

c. steal _____

d. wear _____

e. horse _____

a. _____

b. _____

c. _____

d. _____

e. _____

Communications Unit Progress Test

UNIT I: WORKING WITH WORDS Name: _____

Form 1 Date: _____

Criterion:	64 / 70
Score:	___ / 70

Section A - Item A must be completed before writing this test.

Section B - Write the plural of each of the following words. If the word is already plural, write P in the blank.
(15)

1. creature _____
2. igloo _____
3. assembly _____
4. beach _____
5. cupful _____
6. business _____
7. measles _____
8. safe _____
9. inquiry _____
10. hero _____
11. deer _____
12. knife _____
13. church _____
14. mother-in-law _____
15. plural _____

Section C - Write a contraction for each of the following
(24)

1. I will _____
2. she is _____
3. he had _____
4. could not _____
5. it is _____
6. will not _____

Write the words that these are contractions for.

7. can't _____
8. shan't _____
9. we're _____
10. they'd _____
11. 'twas _____
12. don't _____

Write abbreviations for these expressions.

13. cash on delivery _____
14. paid _____
15. Thursday _____
16. August _____
17. foot _____
18. inclusive _____

Write the expressions that these abbreviations represent.

19. Fri. _____
20. M.P. _____
21. Dr. _____
22. vol. _____
23. Nov. _____
24. eg. _____

Section D. (14) Fill out the chart below with the prefixes, suffixes and root word, from each word on the left.

		Prefix	Root Word	Suffix
1.	troublesome			
2.	decision			
3.	rematch			
4.	unfaithful			
5.	transplant			
6.	research			
7.	deformed			
8.	mislead			
9.	reaction			

Underline the prefix or suffix in each of the following words and in the space provided, briefly define the meaning of the complete word.

10. hopeless _____

11. pretest _____

12. successful _____

13. midnight _____

14. impractical _____

Section E

(1) 1. What is a synonym? _____

_____

(1) 2. What is an antonym? _____

_____

(1) 3. What is a homonym? _____

_____

(6) Write a synonym and an antonym for each word on the left.

	Synonym	Antonym
4. timid	_____	_____
5. tidy	_____	_____
6. monotonous	_____	_____
7. satisfy	_____	_____
8. average	_____	_____
9. important	_____	_____

(8) Write a homonym for each word below, then use both words correctly in sentences.

10. minor _____

_____

_____

11. aloud _____

_____

_____

12. horse _____

_____

_____

13. piece _____

_____

_____

Communications Unit Progress Test

UNIT I: WORKING WITH WORDS Name: _____

Form 2 Date: _____

Criterion:	60/70
Score:	___/70

Section A Item A must be completed before writing this test.

(15) Section B Write the plurals of each of the following words. If the word is already plural, write P in the blank.

1. ox _____
2. echo _____
3. scarf _____
4. shelf _____
5. birdhouse _____
6. community _____
7. donkey _____
8. saleswoman _____
9. fox _____
10. employee _____
11. moose _____
12. cameo _____
13. glass _____
14. history _____
15. news _____

(24) Section C Write the contractions for each of the following.

1. shall not _____
2. he is _____
3. cannot _____
4. I shall _____
5. I did not _____
6. It has not _____

Write the words from which these contractions are formed.

7. I'm _____
8. won't _____
9. we'll _____
10. you'd _____
11. doesn't _____
12. isn't _____

Write abbreviations for the following:

13. amount _____ 16. Mister _____

14. Reverend _____ 17. October _____

15. Canada _____ 18. street _____

Write the expressions that these abbreviations represent.

19. ave. _____ 22. Nfld. _____

20. Dec. _____ 23. etc. _____

21. Sept. _____ 24. pvt. _____

(14) Section D Fill out the following chart, with the prefixes, root words and suffixes from the words on the left.

	Prefix	Root Word	Suffix
1. agreeable			
2. unlocked			
3. mismatch			
4. comedian			
5. unpitying			
6. wisdom			
7. mistreat			
8. unaware			
9. examination			

Underline the prefix or suffix in each of the following words. On the space provided, briefly define the underlined part.

10. indirect _____
11. wonderful _____
12. happiest _____
13. imperfect _____
14. nonsense _____

(7) Section E Write a synonym and an antonym for each of the following words:

	Synonym	Antonym
1. friendly	_____	_____
2. clear	_____	_____
3. uncommon	_____	_____
4. excite	_____	_____
5. strong	_____	_____
6. break	_____	_____
7. start	_____	_____

(10) Write a homonym for each word given and use both words in sentences. Underline the word in the sentence you write.

8. there: _____ _____
_____
_____
_____

9. weather: _____ _____

_____

_____ _____

_____

10. feet: _____ _____

_____

_____ _____

_____

11. council: _____ _____

_____

_____ _____

_____

12. right: _____ _____

_____

_____ _____

_____

Communications Diagnosis

UNIT II: SPELLING

NAME: _____

DATE: _____

First Part

I a. Underline the misspellings in this paragraph:

This morning an accident occurred near Scared Heart Academy. A student causally crossing the street was hit by a car going faster then the speed limit permits. That student is now a patent at Municipal Hospital, but his injuries are not to serious. He can look forword to getting out of the hospital soon. Eventually he will recover completely excerpt for a vary small scar on his shoulder. Even that may disappear latter, according to his doctor.

b. As you worked on that paragraph, did you examine it with no more care than you normally use in rechecking your writing before letting anyone else see it? (Answer "yes" or "no") _____

II a. Have your eyes been examined professionally within the last two years? ("yes" or "no") _____

b. Is your vision up to par, at least with the aid of corrective lenses? ("yes" or "no") _____

III a. Right now is a dictionary within easy reach at the place where you most often write? _____

b. Do you often consult your dictionary to make sure that a spelling is right? _____

Second Part

In each of the following 104 expressions is a word with a blank in it. Put into that blank whatever is needed to complete the spelling of the word. If nothing is needed, do not add anything.

If you are not sure how to spell a word, try to spell it anyhow.

1. Prime Minister Trudeau was re___lected.
2. A___point a committee.

3. She wants a new vac___m cleaner.
4. She prefer___ed the Chevrolet.
5. Which method is he us___ing.
6. He is stud___ing to be a doctor.
7. The son mimic___ed the father.
8. She will d___vorce her husband.
9. Was it enviro___ment or heredity?
10. More ___migrants left Germany daily.
11. What did he advi___e you to do?
12. Look at those misch___vous boys!
13. He wrote many memorand___.
14. This letter was mi___directed. (Sent wrong)
15. What did the teacher a___sign?
16. That was a dif___icult decision.
17. She excel___ed in art.
18. Stop rac___ing your motor.
19. This food satisf___s me completely.
20. Our cow gave birth to twin cal___s.
21. Do not d___spair; he will return.
22. Children fas___inate him.
23. Order some new station___ry soon.
24. Bath___ the dog once a week.
25. In baseball he played left f___ld.
26. Use your best judg___ment.
27. He was u___noticed in the crowd.
28. She was an i___literate old woman.
29. This is unexplored ter___itory.
30. That was a compel___ing reason.
31. It is extrem___ly important.
32. She appl___s for too many jobs.
33. The soprano___s sang quite well.
34. The storm caused much d___struction.
35. Send it to the chemistry lab___tory.

36. The Indians held a coun___l of war.
37. Cotton has the power of absor___tion.
38. He is not religious; he is an ath___st.
39. This has a fine flavo___r.
40. Poor diet caused his thin___ess.
41. Do not su___press the truth.
42. You exag___erate too much.
43. Plan___ing the party was fun.
44. She is always quot___ing the Bible.
45. The attorn___s (lawyers) are studying the will.
46. Pass me the potato___s, please.
47. They are in the same cat___gory.
48. His hobby is mini___ture trains.
49. She always says something compl__mentary.
50. Alabama se___ed from the Union.
51. What grade did you rec___ve?
52. They went to a movie theat___.
53. This is an ove___rated novel.
54. They added an a___nex to the house.
55. There is a good va_ cine for smallpox.
56. She has a win___ing personality.
57. This result is notic___ably better.
58. At the zoo we most enjoyed the monk___s.
59. We have picnic___ed here before.
60. She has too much opt___mism.
61. It came by special deliv___ry.
62. He is a man of high princip___s.
63. The new model super___d the old. (Took the place of.)
64. To be egotistic is to be conc___ted.
65. Is his new suit blue or gr___y?
66. That is real___y the truth.
67. The Prime Minister has an i__mense job.
68. Some people are as stub___orn as mules.

69. This is the hot___est day yet.
70. The car is in a servic___able condition.
71. We are suppl___ing you the best.
72. She has sung many solo___s.
73. Rep___tition helps learning.
74. They crossed the northern bound___ry.
75. Who___hat is that?
76. The soldier's letters were cens___red.
77. He used dec___t to fool us.
78. This gun has a small calib___.
79. She smiled cool___y at him.
80. Su___port at least one charity generously.
81. He is addicted to tobac___o.
82. His prefer___ence is tea.
83. It was a gorg___ous sunset.
84. Her story mystif___me.
85. Listen to those echo___s in the canyon.
86. It was an incred___ble accident.
87. Joe and Lou use___ to be friends.
88. He is an ___m!nent preacher.
89. She works in the person___l office.
90. He's at the h___ght of his career.
91. She has a good sense of hum___r.
92. C___ordinate your efforts.
93. He o___poses everything.
94. His comment embar___assed the customer.
95. Show defer___ence for authority.
96. A car___ful study is needed.
97. The store has many variet___s.
98. They own two piano___s.
99. Coffee is a mild stimul___nt.
100. He was a famous ath___lete.
101. The kitten hurt it___ paw.

102. How will that decision ___ffect you?
103. Eat enough prot___ns every day.
104. The new catalog___ has come.

Third Part

The following expressions should be written (A) as one word, (B) as a hyphenated word, or (C) as separate words. Mark the appropriate space (A,B, or C) by each expression.

		A	B	C
1.	head on (collision)			
2.	post office			
3.	handy man			
4.	weather map			
5.	all right			
6.	hand to mouth			
7.	head waiter			
8.	post master			
9.	hand made			
10.	weather man			
11.	head quarters			

MARKING: This is a Diagnostic Test which you can mark as soon as you have completed it. As you have seen, the test is quite comprehensive, and as a result, marking and tabulating the results is rather involved. Read and follow the directions VERY CAREFULLY.

Get a copy of the book A Self-Improvement Guide to Spelling and turn to page 8. Near the top of the page are instructions for marking the test. Follow these through to the centre of page 9.

Now you are ready to make a PROFILE of your spelling ability. On the Profile chart attached to this paper, CIRCLE the number of each question in which you made an error. Each row on the profile may end up with one or more of the numbers in it being circled, for example:

1 (14) (27) 40 53 (66) 79 92 ____(9)____

If you have 3 or more numbers circled in any single row, you must also circle the chapter number at the end of the row (as shown above).

When you have completed all of the above:

(1) Record on your planning sheet that you have completed the Unit II Diagnosis in Communications.

(2) Record on your planning sheet, the numbers of any and all the chapters which you circled. These are the chapters which you will study.

(3) Hand in your Diagnosis and Profile to your instructor. When the chart is returned, you may go on with the Learning Activities for this Unit.

SPELLING PROFILE CHART

Name: _____

Part of Test	Item Number	Name of Problem	Chapter Number	Instructor Check
First	I a b 1 2 3 4 5 6 7 8 9	Proofreading	4	_____
	II a b	Vision	3	_____
	III a b	Use of dictionary	5	_____
Second				
	1 14 27 40 53 66 79 92	Additive doubling	9	_____
	2 15 28 41 54 67 80 93	Assimilative doubling	10	_____
	3 16 29 42 55 68 81 94	Internal doubling	11	_____
	4 17 30 43 56 69 82 95	Terminal doubling	12	_____
	5 18 31 44 57 70 83 96	Final E	13	_____
	6 19 32 45 58 71 84 97	Final Y	14	_____
	7 20 33 46 59 72 85 98	Other final letters	15	
	8 21 34 47 60 73 86 99	Unstressed vowels	16	_____
	9 22 35 48 61 74 87 100	Added and omitted letters	17	_____
	10 23 36 49 62 75 88 101	Identical pronunciations	18	_____
	11 24 37 50 63 76 89 102	Similar pronunciations	19	_____
	12 25 38 51 64 77 90 103	IE of EI	20	_____
	13 26 39 52 65 78 91 104	Competing spellings	21	_____
Third				
	1 2 3 4 5 6 7 8 9 10	Compound words	22	_____

Instructor: After checking the Spelling Diagnosis Test and the Profile, detach the Profile Chart, and return it to the student.

COMMUNICATIONS

UNIT II: SPELLING

ITEM A: LEARNING TO SPELL

OBJECTIVES

The student must be able to:

1. Use written communication with very few or no errors in spelling.
2. Use a dictionary as a reference for correct spelling.

LEARNING MATERIALS

Books: A Self-Improvement Guide to Spelling, Johnson
Dictionary of Canadian English, Gage

LEARNING ACTIVITIES

The first step in this Item, is to get the Spelling Profile Chart which you filled in from the Unit II Diagnosis. Put this chart in your book with this Learning Activities sheet.

From the Diagnosis, you circled the number of each chapter which you should study in order to become a better speller. For each of these chapters follow these steps:

1. Read the chapter carefully.
2. Following the instructions given; do exercise A at the end of the chapter. Do not copy out the entire exercise, but just list your answers neatly in your exercise books. Mark your work, using the Answer Key at the back of the book.

3. If you made no mistakes in the A exercise, show your work to your instructor and have him initial the assignment as "done" on the line below "Instructor Check" on your spelling Profile Chart. Go on to your next chapter and back to step 1 in this list.

4. If you did not get all the answers correct in the A exercise, begin a "Personalized List of Misspellings" with the words that you did not get correct. Place this list in your exercise book.

5. Reread the Chapter, and do exercise B. If there is no B exercise, as in chapters 5 to 8, re-do exercise A orally, by having another student quiz you. Mark exercise B.

6. If you made no mistakes in the B exercise (or in the A exercise, redone orally) show your work to your instructor, and have him initial the assignment as "done". Go on to your next assignment, and back to step 1 on this list.

7. If you did not get all the answers correct on the B exercise, add the words that you misspelled to your "Personalized List of Misspellings". Discuss your work with the instructor to find out if you need additional work. If the instructor decides not, he will initial the assignment as done. You will go on to your next assignment and back to step 1 on this list. Do not do more than two chapters per day in spelling.

If you continue to have trouble with spelling, take extra care in your written work. Follow the tips on solving spelling problems outlined in Part II of A Self-Improvement Guide to Spelling. Use the dictionary often. Keep your list of misspellings (words that you spell wrong on tests, essays, etc.) and work on learning to spell them. In addition, extra spelling exercises can be found in the course textbooks. Since you have been tested after completing each of the assignments, there is no Item Progress Check or Unit Test for this Item and Unit.

Communications Diagnosis

UNIT III: MECHANICS OF WRITING

NAME: _____

DATE: _____

Section A: Write a few sentences answering the question, "Why are you taking this course?

_____

_____

_____

_____

_____

_____

Section B: Circle the errors in capitalization in the following sentences.

1. the famous Queen of egypt, cleopatra, was born in 69 b.c.
2. it took about Five days to cross the Atlantic ocean, on board the spirit of london.
3. Joan hartley, my closest friend, has been working at the vancouver general hospital since january.
4. reader's digest, a Magazine i enjoy reading, is published every Month.
5. the Receptionist said, "you have to see Mr. t.r. richards about that; you could make an appointment for next wednesday, if you wish."
6. we went to see the Movie, Gone With The Wind.

Section C: Punctuate the following.

1. Can you arrange an appointment for 530 Feb 1 1974
2. Bill how was your exam
3. When we got home we found that the locks had been forced the windows broken the cabinet ransacked and everything thoroughly searched.

4. Read chapter 7 she told us titled Choosing your Words

5. My cousin Rita Hunt will be landing at Orly Airport Paris

6. John as we expected won the citizenship award hed always been active in student affairs

7. Dear Sir

I would like to order the following items 1 pr. of all size work gloves 2 sets of tree fencing and 1 set of garden tools Please bill my account # 2736-C for these items

Yours truly

Section D: Write the correct possessive form of the word in brackets in the space to the right.

1. (John) dog ran away. _____
2. (Mrs. Jones) car is not in the driveway. _____
3. The (bees) hive was blown open. _____
4. The (men) coats hung in the lobby. _____
5. (I) project is nearly finished. _____
6. (We) work is ready to look at. _____
7. That room is (he). _____
8. (You) feet should not be hurting. _____
9. The Wilsons bus left town. _____
10. Those houses are (they). _____

Section E: Circle the correct word to use in the sentence, from the choices in brackets.

1. Dick is not as clever as (she, her).
2. Did he complain about (you, your) leaving early.
3. Nobody brought (his, their) books to class.

4. (She, Her) and her sister went shopping.

5. (Who, Whom) knows the answer to the problem?

6. (Which, Who) of the children looks after this dog?

7. (Who, Whom) do you call for reservations?

8. (Was, Were) the shows very good?

9. The companys name, The Three Brothers, (is, are) on all the letterheads.

10. How many of you (is, are) ready for the test?

11. The class (work, works) on its own.

12. (Lie, Lay) down on the couch.

13. She (sit, set) the books on the table.

14. Terry (leaves, lets) us put our books in his locker.

15. Would you please (learn, teach) me that dance.

16. (May, Can) I borrow, your pencil.

17. He is the (stronger, strongest) of the two boys.

18. That is the (taller, tallest) tree I've seen.

19. She is the (most careful, carefulest) girl in the office.

20. He did very (good, well) on the test.

21. They dove (in, into) the water.

22. We (could hardly, couldn't hardly) hear the speaker.

23. There was (not nearly, nowhere near) enough food at the picnic.

24. He (might of, might have) been waiting elsewhere.

25. Don't (feel bad, feel badly) about your mistakes.

COMMUNICATIONS

UNIT III: MECHANICS OF WRITING
ITEM A: HANDWRITING

OBJECTIVES

The student must be able to:

1. Write legibly and neatly in all written work.

LEARNING RESOURCES

Applied Penmanship: Lyon

Acetate sheets and Felt pens

LEARNING ACTIVITIES

Your work in this item will consist of a series of practice exercises in handwriting. This is to guide your work - your writing need not look exactly like the samples in order to be acceptable. Concentrate on writing neatly and legibly; ask yourself, "Can others read what I write."

1. Compare your handwriting to the samples on the Diagnostic Chart (a yellow card inside the Applied Penmanship book). Make a list of the problems that you need to work on.

2. Read page 1-2 of Applied Penmanship. (Omit the list of supplies suggested there.) Then, begin your work with exercise 1 on page 3-4. Copy this exercise into your notebook.

3. Now, work your way through exercises 2-8 (page 5-18). Practice by using the acetate sheets and felt pens. Trace over the samples given. Also, do about 10 lines of practice in your notebook. Continue to do each exercise in this way, doing no more than 2 per day.

4. Now, redo exercise 1 and compare it to the work done before. If you see little improvement, carry on practice with exercises 11-20 (page 30-44). If you think your writing is now legible, see your instructor. There is no Item Progress Check for this item, so your instructor will assess your progress. Show him your practice work. He may also want to see some of your other written work. When your instructor and you agree that your writing is clear and legible, you may go on to the next item you need work on.

COMMUNICATIONS

UNIT III: MECHANICS OF WRITING

ITEM B: CAPITALIZATION

OBJECTIVES

The student must be able to:

1. Identify the uses of capitals as being-
   a) names of people, places and things (proper nouns)
   b) names of days, months, holidays
   c) important words in titles
   d) I, when referring to self
   e) first words in sentences
   f) direct quotations
   g) initials
   h) titles of respect
2. Correct errors in capitalization in given sentences, either by adding needed capitals or by removing unnecessary ones.
3. Use capitals correctly in written work.

LEARNING RESOURCES

Basic English Review and answer key
Basic Skills in Grammar 1 and 2 and answer keys
English Workshop 9 and answer key
Mastering Capitalization and Punctuation and answer key
Work-A-Text English 1 and 2 and answer key
Acetate (plastic) sheets and felt pens

LEARNING ACTIVITIES

1. Read page 189-190 of Basic English Review. Do the exercises 99A and 99B on page 191. Mark your work.

2. Read the rules given and do the exercises on page 1-10 of Mastering Capitalization and Punctuation. You can use the plastic sheets for these exercises, but keep a record of your errors. When you have done all of the exercises, redo any that you made 2 or more mistakes on. Review the objectives and do Item Progress Check III B, Form 1.

A score that is the same as, or greater than the criterion means that you can go on to the next item that you need work on. A score less than the criterion means that more work is needed.

3. List the rules for using capitals. Work your way through the exercises in English Workshop 9, page 105-114. If you are sure you can now use capitals correctly, see your instructor for Item Progress Check III B, Form 2. If you are not certain that you have mastered the objectives, use the following books, working your way through the exercises, until you are certain that you have learned how to use capitals.

Basic Skills in Grammar 1	page 119-123
Basic Skills in Grammar 2	page 105-111
Work-a-text English 1	page 48, 135, 155
Work-a-text English 2	page 82, 137, 153-5

Remember you have to hand in your work, stapled to the Item Progress Check. Keep all your work together and do not use plastic sheets for these exercises.

Communications Item Progress Check

UNIT III: MECHANICS OF WRITING Name: _____

ITEM B : CAPITALIZATION Date: _____

Form 1

Criterion:	31/33
Score:	___/33

Circle the errors in capitalization in the following sentences.

a. "look out!" he shouted, "that tree is falling."

b. he donated several thousand dollars to the granville community centre.

c. my uncle, dr. johnson, has opened an office in the medical dental building recently completed in kamloops, b.c.

d. what will i do for new years eve?

e.

173 apple ave.,
vernon, B.C.,
V3P 1Z4,
june 15, 1974.

Vancouver city college,
1595 west 10th ave.,
vancouver B.C.

dear sirs:

please send me your information booklet "Creating Your Own Job" to the above address.

yours sincerely,

C. Hartley.

Communications Item Progress Check

UNIT III: MECHANICS OF WRITING Name: _____

ITEM B: CAPITALIZATION Date: _____

Form 2

Criterion:	25/ 30
Score:	___/ 30

Circle the errors in capitalization in the following sentences.

a. john speaks both english and spanish fluently.

b. during the day, bert works as a mailman and at night, he works as a cab driver for the jackson cab company.

c. ralph and i ate breakfast before we set out to climb the golden ears mountains, just north of haney, b.c.

d. have you read "the godfather"?

e. ms. walters, our neighbour, spent the summer holidays in ottawa, the capitol of our country.

f. last june, we visited lake louise.

g. prime minister trudeau visited the vancouver planetarium when he was in the city last spring.

COMMUNICATIONS

UNIT III: MECHANICS OF WRITING

ITEM C: PUNCTUATION

OBJECTIVES

The student must be able to:

1. Identify and use correctly the following punctuation marks:

period	semi-colon
question mark	hyphen
exclamation mark	apostrophe
comma	colon
quotation marks	

LEARNING RESOURCES

Basic English Review and answer key
Basic Skills in Grammar 1 and 2 and answer keys
English Workshop 9 and answer key
English II and III
Mastering Capitals and Punctuation and answer key
Work-a-text English I and 2 and answer keys
Acetate (plastic) sheets and felt pens

LEARNING ACTIVITIES

1. Your first work in this item will be in Basic English Review. Do not do it all at once; there is too much for one sitting.

Instead, do a few pages a day, taking about a week to complete it. You start on page 169, reading the explanations given. After each section, there is a "Tryout Exercise." Then, go on to do the exercises listed under the "Tryout Exercise" box. Do not go on to the next explanation until you have completed the exercises and marked and corrected them. Continue in this way, until you have completed the work up to, and including, page 188. Do your work carefully and correct your errors. You should be ready for the Item Progress Check. Ask yourself to list all the cases where you use each of the punctuation marks listed in the objectives.

Check with your instructor and do Item Progress Check III C, Form 1. If you make the criteria, go on to the next item. If not, continue working, as outlined below.

2. Mastering Capitalization and Punctuation is the book you will use for your work on this item. Once again, its a long section, so break the work up. It would be a good idea to work on one type of punctuation mark at a time. Read the rules and keep a list in your notebook of the rules for each punctuation mark. Write a sample sentence, showing its use in each case. Do pages 15-60. You may use the plastic sheets for pages 15-53, but do pages 53-60 in your notebook. This work, along with your notes and sample sentences will be handed in with Item Progress Check III C, Form 2, which you should be ready to do after finishing this work. If there are still some problems, do the appropriate exercises from the supplementary references listed below, before going on to Item Progress Check III C, Form 2.

Basic Skills in Grammar 1	page 108-115
Basic Skills in Grammar 2	page 87-104
English II	page 10-12, 31-52
English III	page 30-54
English Workshop 9	page 121-32, 139-40
Work-a-text English 1	page 132-35, 154-55
Work-a-text English 2	page 4,80, 133-6, 153-4

Communications Item Progress Check

UNIT III: MECHANICS OF WRITING Name: _____

ITEM C : PUNCTUATION Date: _____

Form 1

Criterion:	27/ 30
Score:	___/ 30

Punctuate the following as required.

a. Punctuation is used to make the meaning of written language clear Punctuation is used in writing to indicate pauses gestures and changes of expression If it werent for punctuation all your words would run together and give strange meanings to your writing

b.

Box 4773
Vernon B C
27 July 1973.

Dear Sirs

Could you please send me the following free publications Food and Drug Consumers Handbook Drugs and You and Drugs Handle With Care. Thank you.

Yours sincerely

c. For this assignment Ms. Harris said read Ch. 7, Making Progress. This is in Success in the World of Work.

d. Who did Janice the new girl in class have lunch with

e. What a fantastic show that was

Communications Item Progress Check

UNIT III: MECHANICS OF WRITING Name: _____

ITEM C : PUNCTUATION Date: _____

Form 2

Criterion:	25 / 30
Score:	___ / 30

Punctuate the following where necessary.

a. If you don't follow directions our teacher warned you may fail this test.

b. Public private and college libraries are looking for summer staff

c. Jim my youngest brother is reading The Godfather

d. You must read through chapter 3 on The Cost of Living before coming to class

e.

417 High St
Vancouver B.C.
16 July 1973.

Dear Sir

I would like to order the following articles

Enclosed please find a money order for $12.75 made out to your firm.

Yours sincerely

f. No doubt you are ready for the test youve completed all the work.

g. Oh no surely you can't mean that

h. Where did you put Jans books

COMMUNICATIONS

UNIT III: MECHANICS OF WRITING

ITEM D : POSSESSIVES

OBJECTIVES

The student must be able to:

1. Select and use possessive forms of singular nouns, plural nouns and pronouns.
2. Select and use possessive forms to fit the context of a sentence.

LEARNING RESOURCES

Basic English Review and answer key
Basic Skills in Grammar 1 and 2 and answer keys
English II
English Workshop 9 and answer key
Mastering Capitalization and Punctuation and answer key
Mastering Good Usage and answer key
Mastering Parts of Speech and answer key
Work-a-text English 1 and 2 and answer key

LEARNING ACTIVITIES

1. You will need some background information for this Item, so begin by reading p. 20 of Work-a-text English 1, and do the exercise provided. Mark your work.
2. Now, read p. 22 of Work-a-text English 1 and do the exercises. Make sure that you understand the rules before beginning the exercise. Mark your work.
3. Do p. 80 of Work-a-text English 1 and then go on to p. 82 and 84 of that book. Make sure that you know what a pronoun is, before you examine possessive pronouns. Mark your work.

4. For more review of nouns and pronouns, do pages 12, 14, 16 and 18 in Work-a-text English 2. Mark your work, and review the objectives for this Item. If you are ready do Item Progress Check III D, Form 1. If not, review the pages you worked on, until you are ready for the check.

A score less than the criterion indicates more work needed. Continue work as outlined below, keeping the objectives in mind.

5. Read p. 49-50 of Mastering Capitalization and Punctuation. Make notes on the rules for forming possessives. Then, do the exercises on those pages. Do these in your notebook. Remember to hand them in with the Item Progress Check when you do it. Mark and correct your work.

6. Now, do pages 15, 17-22 in Mastering Parts of Speech. Read the rules and copy them into your notes. Do the exercises and work and correct them. You should be ready for Item Progress Check III D, Form 2. Check with your instructor---if you feel you are not ready, work through some of the exercises listed below, until you have mastered the objectives.

Basic English Review	p. 35-38, 51-59
Basic Skills in Grammar 1	p. 103-4
Basic Skills in Grammar 2	p. 94-97
English II	p. 68-9
English Workshop 9	p. 135-138
Mastering Good Usage	p. 40-42

You are now ready for Item Progress Check III D, Form 2.

Communications Item Progress Check

UNIT III: MECHANICS OF WRITING Name: _____

ITEM D : POSSESSIVES Date: _____

Form 1

Criterion:	19 /20
score:	/20

1. Rewrite these sentences, changing the expression in italics to one word and putting it where it best fits in the sentence.

(7)

a. Those are books *belonging to Mary*.

_____

b. The coats *of the ladies* hung in the hallway.

_____

c. The policy *of the navy* is to begin training early.

_____

d. The car *of Mr. and Mrs. Jones* was sent in for repairs.

_____

e. See if you can find the hat *belonging to him*.

_____

f. The fish swam through the holes in the nets *belonging to the fishermen*.

_____

g. I saw the captain *of the ship* on the quarter-deck.

_____

2. Write the possessive form of each of these nouns.

(4)

books _____ Henry _____

family _____ James _____

3. Circle the correct possessive pronoun in each of the following sentences:
(9)

a. (Their, There, They're, Them) books are already packed away.

b. (His, Him, He's) coat was left on the table.

c. The fish wiggled (it's, its) tail as it swam away.

d. Give me (mine, my, me) workbook.

e. Are those things (her's, hers, her) ?

f. (Whose, who'se, who's) car is that?

g. That bicycle is (my, mine, me).

h. Where is (our's, our, ours) bus waiting?

i. That furniture is (our, our's, ours).

Communications Item Progress Check

UNIT III: MECHANICS OF WRITING Name: _____

ITEM D : POSSESSIVES Date: _____

Form 2

Criterion:	17/ 20
Score:	___/ 20

1. Write the possessive forms of each of the following nouns.

(10) a. Bill _____

b. man _____

c. Janis _____

d. civilization _____

e. dog-catcher _____

f. parents _____

g. children _____

h. dogs _____

i. the Mitchells _____

j. step-sisters _____

2. Circle the correct possessive form of the word in brackets.

(10) a. The house, with (its, it, it's) broken windows, looked completely deserted.

b. (Her, hers, her's) hair always needs combing.

c. Are those (they's, theirs, their) camping tools.

d. The piano by the door is (theres, theirs, their's).

e. (I, my, mine) cat is missing; I hope it hasn't lost (its, it's, it) way home.

f. Give him (his, he's, him) books.

g. Those packing cases are (our's, ours, our) to use

h. Are these dishes (your, your's, yours) ?

i. Is that boat the same style as (your, your's, yours) boat?

COMMUNICATIONS

UNIT III: MECHANICS OF WRITING

ITEM E : GOOD USAGE

OBJECTIVES

The student must be able to:

1. Select and use correctly commonly misused pronouns.
2. Select and use correct expressions in commonly misused agreement patterns, such as subject/verb agreement, etc.
3. Select and use correct comparitive and superlative forms.
4. Select and use correct expression in given examples of commonly confused words such as lie, lay; lend, borrow; learn, teach.
5. Correct errors in given sentences containing double negatives and redundancies.

LEARNING RESOURCES

Basic English Review and answer key
Basic Skills in Grammar 1 and 2 and answer keys
English II and III
English Workshop 9 and answer key
Mastering Good Usage and answer key
Work-a-text English 1 and answer key

LEARNING ACTIVITIES

There are many types of usage errors and most people are guilty of only a few. For this reason, many exercises are listed, but you need do only those that you have difficulty with. For each case, do the work as outlined in these steps.

a. Do the first 5 questions of the exercise (the first page # in the brackets below). Mark your work. If you get 5/5, go on to the next set of brackets and do step (a) again.

b. If you made 1 or more errors, read the explanation (the last page #, underlined in each set of brackets below), and make notes on the rules.

c. Do the rest of the exercise and any others given in the brackets. Mark your work and go on to the next set of brackets and step (a) again.

* Do each set of brackets, and check them off when done.

1. These exercises are to be done, using the steps outlined above, before doing Item Progress Check III E, Form 1.

Basic English Review

(47, 41) (48, 60, 42) (49, 45) (57, 51)

(58, 59, 53) (61-64, Review if needed) (79, 75)

(80, 77) (85, 81) (86, 82-3) (93, 94, 89-92)

(97, 95) (98, Review) (109, 105) (110, 107)

(115, 111) (116, 111) (117-9, Review)

(127, 128, 123-4) (199, 197) (200, 198)

(207, 208, 201-6) (211-2, 209-10) (213-216, Review)

Now, do Item Progress Check III E, Form 1.

If you did not make the criterion, do the exercises listed below, in the same way that you did the first set of exercises. Remember, you will have to hand this work in, so do it in you notebook.

2. Do the required exercises from this list, before doing Item Progress Check III E, Form 2. Use the steps outlined on the previous page.

Mastering Good Usage

(5, 6, 1-4)	(10, 7-9)	(11-12, Review)
(14-15, 13)	(19, 20, 16-18)	(23-4, 21-2)
(26, 25)	(28, 27)	(31-2, 29-30)
(33-4, Review)	(43, 38-42)	(44, Review)
(46, 45)	(48, 47)	(52, 49-51)
(54, 53)	(56, 55)	(57-60, Review)

You should now be ready for Item Progress Check III E, Form 2.

If you feel that you are not ready, use the following references, as needed. Check all of the pages and exercises to see if they cover topics you need.

Basic Skills in Grammar 1	p. 66-100
Basic Skills in Grammar 2	p. 46-67
English II	p. 81-100
English III	p. 127-158
English Workshop 9	p. 173-9, 205-6, 215-7
Work-a-text English 1	p. 26-32, 62-64, 76-88, 104-114, 148-153

Communications Item Progress Check

UNIT III: MECHANICS Name: _____

ITEM E: USAGE Date: _____

Form 1

Criterion:	33 /35
Score:	___/35

Circle the correct expression, from those in the brackets, to fit the context of the sentence.

1. If you were (him, he) would you act like that ?
2. I borrowed a dollar (off, from) Willie.
3. Jan and Tony like (his, their) occupations.
4. Employers seldom hire unskilled help if (he, they) can get experienced workers.
5. He is the man (who, whom) will sell the new line .
6. Have you decided (who, whom) will sell the new line ?
7. We prefer to read stories (which, what) are short.
8. Jane has a typewriter (that, which, who) is smaller than most.
9. (Is, Are) you allowed to leave early ?
10. Her letters and my letter (has, have) perfect style.
11. There (was, were) many authors who illustrated their own books.
12. There (is, are) no books, by that author, left on the shelf.
13. The note is still (lying, laying) there.
14. He (has laid, has lain) on the couch all day.
15. They (sat, set) the books on the window ledge.
16. They were (sitting, setting) balloons on the nails.
17. Could you (learn, teach) me to play the piano ?

18. If I (should, would) come late, will you wait ?

19. I wanted to (borrow, lend) his textbook to my friend.

20. You (may, can) make a good impression if you dress (good, well) for an interview.

21. A (littler, less, smaller) box is needed to pack these dishes in.

22. She bought a (less, least) expensive model.

23. Bill is the (faster, fastest, most fast) sprinter in our class.

24. Jan is (carefuller, more careful) than Bob.

25. (Most, Almost) everybody knew the answer.

26. She is a (real, very) smart girl.

27. (Beside, Besides) Stanley Park, where else did you go ?

28. I (might of, might have) gone if I'd been ready.

29. You (seldom ever, seldom) see those birds anymore.

30. I didn't want it (anyways, anyway).

31. Those cats are (different from, different than) any others I've seen.

32. You (ought not, shouldn't ought) to miss the classes.

33. What (kind of a , kind of) country is Canada ?

34. Theres lots to see (inside the, inside of the) old store.

Communications Item Progress Check

UNIT III: MECHANICS OF WRITING Name: _____

ITEM E : USAGE Date: _____

Form 2

Criterion:	31/35
Score:	___/35

Circle the correct expression, from those in the brackets, to fit the context of the sentence.

1. He is going to take Sue and (I, me) to dinner.
2. Everyone should enjoy (his, their) hobbies.
3. Many people would accept part time work if (he, they) could get it.
4. (We, us) students work well as a group.
5. She is the person (who, whom) I would choose for that job.
6. (Who, whom) sent this book to us ?
7. (Which, what) windows were left open ?
8. (Which, what, who) did you think was the better solution?
9. You didn't say which ones (was, were) coming.
10. Very few people (is, are) ready to take further training.
11. Her children played with my son; they all (had, have) a good time.
12. There (is, are) no place to put these books.
13. The cats were still (laying, lying) in the sunshine.
14. She (has laid, has lain) in the sun all day.
15. Please (sit, set) those packages on the table.
16. We were all (sitting, setting) in the living room when we heard it.

17. He wanted to (learn, teach) me about flying.
18. I (lay, lie) on the sofa all day yesterday.
19. Mary (raises, rises) early even on weekends.
20. I (may, can) choose to go with you.
21. His work is very (good, well) presented.
22. She owns a (bigger, biggest, more big) car than I.
23. There are (less, fewer) cars of that model still on the road.
24. He is a (fast, more fast, faster) driver than you.
25. We need a (littler, less, smaller) area for this display.
26. She is (beautifuler, beautifulest, more beautiful) than the other contestants.
27. I was (real, very) unprepared for this.
28. Just (between, among) us, I was not correct.
29. He (might of, might have) come earlier.
30. Don't (feel bad, feel badly) about those results.
31. (Try and, Try to) get him to come.
32. (This here, This) book is about Geography.
33. He is (nowhere near, not nearly) as hard working as I am.
34. They were a (long way, long ways) from home.
35. That boat is quite (different than, different from) ours.

Communications Unit Progress Test

UNIT III: MECHANICS OF WRITING Name: _____

Form 1 Date: _____

Criterion:	65 / 68
Score:	___/68

Section A: Item A is not tested. The student must have completed the Item, if it was assigned, before doing this test. Improvement in handwriting must be evident in written work.

Section B: Circle the letters that should be capitalized.

(16)

1. we invited rev. d.s. black to come for thanksgiving dinner.
2. when can uncle george have an appointment to see mr. lind-strom ?
3. we were told to wait outside the birks building.
4. the san francisco golden gate bridge is one of the longest suspension bridges in the world.
5. the period from just after christmas until mid-february is the coldest.
6. "dear sir:" i wrote,"could you please send me 5 copies of drugs and their dangers."

Section C: Supply punctuation marks in the following sentences.

(22)

1. Nurses beauticians barbers and waitresses all need to get along with people.
2. Since cars get more complicated all the time a mechanic no matter how good he is must keep learning.
3. The article written by O W Hudson was called Preparing for a Career of Service.
4. Did you see the satellite launching on T V Bill asked Man was that great

5. My boss was born in Dublin Ireland on June 15 1923 at 615 pm.

6. My mother explained that she had met Sarah the girl next door in the drugstore.

7. Please send the following 6 copies of The World of Work and 3 copies of Getting Ahead

8. Johns father wont be coming with us hes got a touch of the flu.

Section D: Write the possessive forms of the following. Write the complete phrase.
(10)

1. office of the doctor _____
2. car of the family _____
3. signs of the stores _____
4. shoes of the women _____
5. book of my mother _____
6. hats of them _____
7. children of some people _____
8. books belonging to him _____
9. me entering the contest _____
10. that girls speed on the typewriter _____

Section E: Circle the correct expression, from those given in brackets, in each sentence below.
(20)

1. (Lie, Lay) down on the couch until you feel better.
2. (Learn, Teach) me to play the piano.
3. Some people (is, are) never satisfied.
4. Anyone (is, are) allowed to come.

5. A group of us (is, are) going to the film.

6. Why (doesn't don't) he come, too?

7. There (was, were) (fewer, less) people in class yesterday.

8. Don't (leave, let) the window stay open for long.

9. He is the (smartest, smarter, most smart) person I've met.

10. He wanted to (borrow, lend) me his book.

11. He (might of, might have) come if we'd told him earlier.

12. The boys jumped (off, off of) the rocks, into the water.

13. (Were, Was) you ready to go?

14. Don't (feel badly, feel bad) about it.

15. We were a (long way, long ways) from the nearest town.

16. (Try and, Try to) finish on time.

17. We (could hardly, couldn't hardly) hear the speaker.

18.t Each of us works as (well, good) as we can at doing the (best, bestest, most best) job.

Communications Unit Progress Test

UNIT III: MECHANICS OF WRITING Name: _____

Form 2 Date: _____

Criterion:	66 / 72
Score:	__ / 72

Section A: Item A must be completed , with an improvement in handwriting shown in written work, before this test is done.

Section B and Section C: Put punctuation marks and capitals in the following sentences where needed.

(40)

1. dr frederick banting discovered insulin which is claimed to be a cure for diabetes.

2. the membership of the group was made up as follows labourers 2 lawyers 2 business men 3 doctors 2

3. My uncle frank said while flying to winnipeg on an air canada plane i read part of around the world in eighty days by jules verne.

4. While searching for a northwest passage around north america henry hudson discovered hudson bay and hudson straight and explored the hudson river as far as albany.

5. no doubt he had arranged to be in two places at once but we should wait at least another hour

6. Where asked marrianne was he planning to take you

7. oh no dont say that

8. I have an interview arranged for 420 on january 18th at the forrester building.

Section D: Circle the correct form of the possessive from the brackets, in each sentence below.
(10)

1. (My, Mine, Me) absence from school caused concern.
M

2. There was a beautiful (spiders, spider's) web stretched across the branches.

3. The (class, classes, class's) production of that play was excellent.

4. Are you going to give him (he's, his, its) books.

5. Nobody handed (his, their) work in.

6. (John's, Johns, John) speech was the best.

7. That (lady's, ladies', ladi'es) coat was left behind.

8. The little dog wiggled (its, it's, t) tail vigorously.

9. Where did you put (our, our's, ours') packages?

10. Are those booklets (her, her's, hers)?

Section E: (20) Circle the correct expression, (from those in brackets) in each sentence.

1. You (was, were) the one chosen to clean up.

2. Where (is, are) Terrie and Ted?

3. Why (didn't, don't) Ronnie drive?

4. We don't do that (any, no) more.

5. There are(fewer, less) people on the bus today.

6. His case is the (better, best) of the two.

7. After last nights party, I'm feeling (worse, worser, more worse) than usual.

8. (Leave, Let) the door stay open for awhile.

9. Just (sit, set) those things on the seat beside you.

10. Bill and Rob chose (his, their) best writings for display.

11. His books and my atlas (has, have) been sent.

12. He promised to (learn, teach) me that song.

13. I (would, should) have listened to his advice; now its too late.

14. The hen (laid, lied) its eggs in a special nest.

15. May I (borrow, lend) you this book?

16. What (sort of, sort of a) person is he?

17. We (hardly ever, seldom ever, seldom) saw them, although they had been our closest friends.

18. I (ought not, shouldn't ought) to miss any more time.

19. He didn't want it (anyway, anyways).

20. Ten dollars (is, are) enough.

Communications Diagnosis

UNIT IV: READING SKILLS

NAME: _____

DATE: _____

Section: A In each sentence below, there is a blank space where a word has been omitted. Under the sentence are several words, one of which best fits the context of the sentence. Write that word in the blank.

1. The trees were dried and _____ after the four year drought in the Southeast.

singed charred parched shriveled

2. Mining, even by _____ modern methods, is a dangerous occupation and the miner runs daily risks.

economical safer, costly ever-changing

3. Make your writing instantly clear and effective, so the reader loses no _____ and energy in understanding.

place speed time quickness

4. Unemployment insurance is insurance against risks of unemployment. A system of unemployment insurance would therefore provide an _____ for a working man who is temporarily laid off.

increase income earning immunity

For each sentence below, write a brief definition for the underlined word, as it fits the context of the sentence.

5. If somebody talks <u>glibly</u>, we say, "He has a good line".

glibly _____

_____

6. Because of the explosion, the building was in <u>imminent</u> danger of collapsing.

imminent _____

_____

7. His firm allowed their customary and regular discount.

customary _____

_____

8. It is useless to get annoyed at her <u>unscrupulous</u> behavior.

unscrupulous _____

_____

Put the following words in alphabetical order.

9. capital capable capsule capon capitalism
capacity capilliary cap caper

_____ _____ _____

_____ _____ _____

_____ _____ _____

Use the dictionary to look up these words and use each one in a sentence.

10. <u>spelunker</u> _____

_____

11. <u>pretentious</u> _____

_____

12. <u>plagiarize</u> _____

_____

Section B: Write the main idea of each paragraph.

1. Doctors tell us that people today do not get enough exercise. Machines do too much of our work for us. Exercise is important for good health during our whole lifetime. Children need exercise so their bodies will develop properly. For adults, exercise helps to keep the body firm and the muscles from getting weak. Exercise also helps to improve blood circulation, breathing, and digestion. By helping keep our bodies healthy, exercise also helps to keep our minds healthy too.

2. Many women complain that good sources of protein like lean meat and fish are very expensive. Lean meat is expensive, but many good sources of protein, such as dried peas and beans, eggs and peanut butter, are very inexpensive. For example: two tablespoons of peanut butter spread to make two sandwiches and served with a glass of milk has as much protein as half a pound of ground beef or steak. The peanut butter lunch may cost about 20¢ where the ground beef or steak lunch may run from 60¢ to 90¢. So for a good inexpensive lunch for growing children, give them the peanut butter sandwiches that they love!

3. Many women do not cook vegetables properly. One of the worst things women do when preparing vegetables is to cook them too long. This destroys some of the vitamins as well as the flavor. Boiling vegetables in too much water will do the same thing. Even something as simple as taking off too much peel means that some of the vitamins and minerals that are mostly close to the skin are lost. Vegetables should be cooked as soon as they are prepared and not left in water for several hours . They should be served right after they are cooked, and not left to sit in a pot or oven.

Write the main events of the following paragraph, in the order that the events happened.

4. I heard a loud splash and turned around just in time to see Jack fall into the water. It had happened this way. Jack and Tom had rowed the boat to the shore. Tom had jumped out of the boat as they neared the shore, to pull the boat out the rest of the way. Just as Tom started to pull, Jack stood up and when Tom pulled, Jack did a back flip into the water. He yelled, while the rest of us stood on shore and laughed.

Read each sentence; decide which part is cause and which is effect and write cause or effect in the space.

5.
   i. The pilot knew he was low on fuel _____
   ii. so he looked to see where he could land. _____

6.
   i. When Joan got her typist job _____
   ii. she was thrilled. _____

7.
   i. John would never have won the snowmobile race _____
   ii. if he had not tuned up his engine the night before. _____

Write all the details that support the underlined sentence.

8. I am lonely and unhappy most of the time now. Ever since I left home and moved to town, I have had no end of trouble. It was very hard for me to find a place to live at first. The place I do rent is very small, and the people above me are not friendly. I have been unable to make any friends. I am shy, so I have trouble talking to people I don't know very well. It is hard to find my way around because I am not used to a big city, but I don't have any place to go anyway. To make things worse, jobs are hard to get.

_____

_____

_____

_____

Read the following paragraph carefully and then follow directions at the bottom of the page.

9.

Cheese

If you are a parent, teach your children to eat cheese when they are very young. Cheese gives you a great deal for your money. Most of the calcium children need in a day can be found in two glasses of milk and an ounce of cheese. Cheese is also an excellent substitute for expensive lean meat protein. And to top that, expensive cheese is not as nourishing for children as inexpensive processed skim milk cheese. These cheaper processed cheeses have half the calories for half the price plus more calcium!

It takes eleven pounds of milk to make one pound of cheddar cheese. Some of the food value may be lost in the process of turning milk to cheese, but most of the calcium and protein remains in the cheese. So one ounce of cheese gives you as much calcium as one glass of milk. A child or an adult that does not like milk would be wise to eat cheese every day.

On the next page you will find six statements. Some are true, and some are false according to the information in the paragraph above. Put an F beside the ones that are False and T beside the ones that are True. DO NOT LOOK BACK.

_____ a. Expensive cheeses are as nourishing for children as processed skim milk cheese.

_____ b. It takes 11 pounds of milk to make 1 pound of cheddar cheese.

_____ c. An ounce of cheese provides all the calcium a child needs in a day.

_____ d. Processed skim milk cheese has fewer calories than more expensive cheeses.

_____ e. One ounce of cheese has as much calcium as a quart of milk.

_____ f. Cheese gives you a great deal for your money.

10. Mary thinks blondes have more fun. She wants to dye her brown hair. Here are the directions she has to follow. Read them carefully, then answer the questions that follow.

EASY DIRECTIONS FOR SHAMPOOING IN
BRIGHT BLONDE HAIR COLORING

REMEMBER:
1. Do not use if you have had a permanent within 6 months.
2. Do not use if you have used hair coloring within the last year.

5 EASY STEPS:
1. Give yourself a skin test. Do this by rubbing a small amount of the solution on a small part of your arm. If your skin turns red within one hour do not use this product. You may be allergic to it.
2. If you have no reaction: Mix half of the solution in Bottle A with all of Bottle B.
3. Pour this over dampened hair and shampoo in. Rinse.
4. Repeat step 3 with rest of solution in Bottle A.
5. Wait 1 hour and rinse again until water runs clear. Now dry and set. You're a blonde! Go out and have some fun!

CAUTION: Keep out of reach of children. Harmful if swallowed.

a. What are the two important things to remember?

1. _____

2. _____

b. How many times is Mary to rinse her hair? _____

c. Which solution does Mary divide in half? _____

d. Why is Mary supposed to give herself the skin test?

_____

Section C: For each of the following passages, state the author's purpose. (entertain, persuade or inform) Briefly explain why you chose that purpose.

1. The childhood I recall was anything but joyous. The firmest memory I have is the ache of acute loneliness and constant searching for a hiding place. I hid in the attic; I hid in books. Rebellion and aggression and vandalism became my way of life.

_____

_____

_____

2. Many, many millions of years ago, the world was a wetter place than it is today. Much of the land that is now prairie and mountain was covered with lakes and great seas and flat, muddy marshes. The weather was warmer than it is now, too, all over the world. It was warm even near the North Pole and the South Pole. And it stayed all year long. It was in this wet, warm world that dinosaurs lived.

_____

_____

_____

_____

3. A natural satellite of the earth is the moon. The moon circles the earth approximately every twenty-nine and one-half days. This is called a lunar month. The moon is much smaller than the stars and the sun but appears to be large because it is closer to us.

4. On the housekeeper's first day of work she read the list Mrs. Rogers had left for her. The housekeeper read from the list, "Dust the furniture." "Did you ever hear tell of such a silly thing? At my house we undust the furniture. But to each his own way."

She saw a big box with the words Dusting Powder on it. "Well, look at that. A special powder to dust with!" exclaimed the housekeeper. So she dusted the furniture. "My, how nice it smells."

5. One of the best ways to get stains out of clothes is to bleach the stain. Bleach takes out more stains than any of the other well known types of stain remover. If you use Bestman's Bleach, you know you are using the finest bleach available.

6. Read the article on page 114 of Writers in Conflict. Its title is "Just like a man". Briefly, outline the author's bias and support your view by making specific reference to the article.

_____

_____

_____

_____

_____

_____

Section D:

1. What is a fact?

_____

_____

2. What is an opinion?

_____

_____

Read the sentences below. Write F before the statement of fact and O before the statement of opinion.

____ 3. Dogs are friendlier than cats.

____ 4. My bookcase will fit between the two chairs.

____ 5. Phil has the funniest lines in the show.

____ 6. It will take many hours to set my hair.

____ 7. I think the box was too heavy for Sally.

Read these two paragraphs expressing different views on marriage. Which do you agree with? Tell why.

8. a. Women who get married are crazy. Who wants to be an unpaid servant for the rest of her life? A woman becomes a second class citizen and loses her identity. She is no longer Jane Smith but Mrs. John Black. What man would give up his name as willingly as so many women do?

b. Not all women are cut out for marriage, but most women are because they are trained from the time they are small to expect to be married some day. Most women, if they have realistic expectations, find marriage a challenging but satisfying institution. Today married women are especially fortunate because they can enjoy both having a job and raising a family.

Opinion and why: _____

_____

_____

_____

_____

Read this selection and write your opinion of it. Support your choice.

9. People should not be allowed to shoot animals. It is an expensive and foolish sport. Few people eat what they kill. Many animals are becoming extinct. We should protect all our wildlife by passing laws that forbid people to shoot animals.

_____

_____

_____

_____

State your own opinion with support, on one of the two topics below. Give at least two supporting ideas.

10. a. Canadians should not need to be bilingual.

or

b. Courts of law should provide lawyers for people who can't afford them.

Section E: Identify each of the following advertising statements as based on fact (F) or based on opinion (O). Explain your choice.

1. The Successful Man's Car

More successful young men are driving the Apalousa than ever before. The kind of men who know the best when they see it - and go out and get it. Apalousa - the luxury car at a practical price.

2. Everyone knows that millions of square miles of our forest land are lost every year through fires. Many of these fires begin from campfires which have not been extinguished properly. Northern Development Company has on the market a small compact inexpensive campfire extinguisher that works quickly and effectively to put out your campfire. It is inexpensive and light to carry. Sand and water are not always easily available. Protect our forest; use - Noflame Extinguishers.

_____

_____

_____

_____

Take a guess and match these propaganda devices with the kind of argument used for each. Put the number of the device in front of the explanation.

3.	Name calling	____ a.	Famous actress demonstrates product.
4.	Band wagon	____ b.	Everybody uses this product
5.	Glittering Generalities	____ c.	Uses words with bad connotations
6.	Transfer	____ d.	Tells only one side (the good side) of the story
7.	Plain Folks	____ e.	Associates product with something we all believe in
8.	Card Stacking	____ f.	It's right for everyday sort of people
9.	Testimonial	____ g.	Uses words with good connotations

Name the propoganda device used in each of the following advertisements. (There may be more than one)

10. _____ A jolly dog is a happy dog. You want gaiety in your puppies. Serve them Jolly Jump-up Dog Food.

11. _____ Elizabeth Tailor says she doesn't use any other hand cream but Soft-Touch.

12. _____ If you love good, simple home-style cooking, like mom used to make - you'll love our frozen pies.

13. _____ Buy Supercraze Gum. Everyone is chewing it.

14. _____ Five doctors out of six recommend Tinytot Aspirins.

15. _____ Join the Young Generation - drive a Speedy Motorbike.

COMMUNICATIONS

UNIT IV: READING SKILLS

ITEM A: WORD MEANING

OBJECTIVES

The student must be able to:

1. Use context clues to determine the meaning of unfamiliar words.
2. Write a word, (to replace a nonsense word) that fits the context of a sentence.
3. Write a group of words in alphabetical order.
4. Find and read the definition of a given word in the dictionary and use that word in a sentence.
5. Read and list the forms of given words from a dictionary. (e.g. write - wrote, written, writing)

LEARNING RESOURCES

Dictionary of Canadian English, The Senior Dictionary

Basic Reading Skills; workbook and tapes and answer key

Increase Your Vocabulary 2 and answer key

English III

English Workshop 9 and answer key

Work-a-text English 1 and answer key

Acetate sheets and felt pens

LEARNING ACTIVITIES

1. You begin this Item by working on context clues. Use Basic Reading Skills, both the tapes and the workbook. Begin with p. 11 and tape #4. Do p. 12 (tape 5), p. 14-15 (tape 6), p. 17 (tape 8) p. 18-19 (tape 9) and p. 20-1 (tape 10). Do no more than 2 tapes per day. After you have finished, do p. 22-3 and tape 11 and a review. If you score less than 14, do tapes 1-4 and 7 with the corresponding pages, before going on to the next step.

2. For dictionary work, read about "Inflected Forms" on page XVI of the Senior Dictionary. Then use Basic Reading Skills again, but only the workbook, not the tapes. Do p. 167-170, 172-175. There is a Check Yourself exercise on p. 174. If you score 11 or more, go on to Item progress Check IV A, Form 1. If not, review p. 167-175 before you do the Item Progress Check IV A, Form 1.

If you made the criterion on Item Progress Check IV A, Form 1, go on to any other Items in this Unit that you need work on. If not, discuss your check with your instructor. You will only do the work that you need for this Item, so find out if you need context work or dictionary work. If you need both, do the work outlined for both.

3. Context clues - Read p. 16 and do the exercise on p. 17 of Increase Your Vocabulary 2. Also, do the exercises on p. 46, 70, 90, 101, 105, 120 of that book. For more review, use English Workshop 9 doing p. 27-8, 61-2, 189-90.

4. Dictionary use - A good source of information on the dictionary is the dictionary itself. Use The Senior Dictionary, and read p. ix-xii. Skim through it and make notes on 'locating an entry' and what you can find in that dictionary. Then read p. 9-13 and 16 in Increase Your Vocabulary 2. If you still need more practice on using a dictionary, use p. 111 of Work-a-text English 1 and p. 75-77 of English III.

5. Do the review exercise on p. 156-8 of Better and Faster Reading. Mark your work. If you made less than 1 mistake on each section, you can go on to the Item Progress Check. If not, review the activities listed, until you have mastered the objectives.

You are now ready for Item Progress Check IV A, Form 2. Check with your instructor before doing it, and remember to staple your previous work to the Check before handing it in.

Communications Item Progress Check

UNIT IV: READING SKILLS Name: _____

ITEM A : WORD MEANING Date: _____

Form 1

Criterion:	19/ 21
Score:	___/ 21

(5) 1. In each sentence below, there is a space where a word has been omitted. Under the sentence are several words, one of which best fits the context of the sentence. Write that word in the blank.

a. They had a sumptuous home; more _____ than any I have seen before.

dreadful luxurious exciting cluttered

b. There is no _____ of further earthquakes because the last upheaval caused the earth under the lake to settle.

suspicion tremor danger anxiety

c. Road maps will be distributed to visiting _____ suggesting that they follow the "Gold Rush Trail".

groups tourists children pilots

d. More than 1,500 boats used the new canal, with pleasure boats accounting for most of the _____.

traffic shipment passage business

e. A folder, describing each park, and including a map showing the _____ of each one, is available free.

harbor attractions service location

(5) 2. For each sentence below, briefly define the underlined word, as it fits the context of the sentence. Do not use a dictionary.

a. Look up the source of a word and you'll get a glimpse of history itself.

source _____

b. The blessing "God be with Ye" was compressed into one word, good-bye.

compressed _____

c. Eliminate all material that does not pertain to your topic.

pertain _____

d. They made a preliminary survey before planning any changes.

preliminary _____

e. The teacher heartily congratulated the student on his excellent work.

heartily _____

(2)3. Arrange these lists of words in alphabetical order.

a.		b.	
batter	_____	technical	_____
buttress	_____	tear	_____
buffet	_____	teal	_____
barometer	_____	tease	_____
business	_____	tea-room	_____
borscht	_____	tea-pot	_____
bridging	_____	tea-set	_____
blueprint	_____	tea-cup	_____

(5)4. Use the dictionary to look up these words, and write a sentence using each one correctly.

a. confiscate _____

_____

b. amphibious _____

_____

c. premonition _____

_____

d. detracting _____

_____

e. sacrilegious _____

_____

(4) 5. Find each word in the dictionary and copy the forms (ways in which the root word is used) given.

a. swim _____

b. see _____

c. take _____

d. drive _____

Communications Item Progress Check

UNIT IV: READING SKILLS Name: _____

ITEM A : WORD MEANING Date: _____

Form 2

Criterion:	17 / 21
Score:	___ / 21

(5)1. In each sentence below, a blank space shows when a word has been omitted. Under the sentence are several words, one of which best fits the context of that sentence. Write that word in the blank.

a. _____ results from a mosquito bite.

antidote hallucination convalescence irritation

b. Success in manufacturing a product depends upon maintaining a consistent _____.

quality accomplishment capacity virtue

c. The court to which a particular case is referred depends on the subject matter of the _____.

struggle debate controversy feud

d. Tornados know no _____; they can start at any time of year.

expedience convenient time season seasonableness

e. To many, it was a lark, a sudden _____ from the routine of daily work.

calm relaxation holiday rest

(5)2. For each sentence below, briefly define the underlined word. Do not use a dictionary.

a. The fundamental purpose of window displays is to arouse the shoppers' interest.

fundamental _____

b. An alphabet is a list of letters arranged in a definite order that doesn't change.

definite _____

c. What prerequisites does he need for the job, other than an ability to write?

prerequisites _____

d. Do not expect all your work to be monotonous; some parts will be interesting.

monotonous _____

e. We can't condone such terrible behavior.

condone _____

(2) 3. Write the following columns of words in alphabetical order.

a.		b.	
khaki	_____	function	_____
key-note	_____	fugitive	_____
key	_____	fume	_____
kernel	_____	fumble	_____
ketch	_____	funnel	_____
ketchup	_____	funeral	_____
kept	_____	fulcrum	_____
key-hole	_____	fungus	_____

4. Use the dictionary to find these words and use each one correctly in a sentence.

(5)

a. deteriorate _____

_____

b. inopportune _____

_____

c. slovenly _____

_____

d. subtle _____

_____

e. chronic _____

_____

5. Use a dictionary to find these words and write the forms given.

(4)

a. shave _____

b. blame _____

c. well _____

d. stop _____

COMMUNICATIONS

UNIT IV: READING

ITEM B : BASIC COMPREHENSION

OBJECTIVES

The student must be able to:

1. Write the main idea of a reading selection.
2. Identify the main events and write them in sequence.
3. Identify cause and effect in given statements.
4. List important facts and details that support the main idea of a selection.
5. Answer "what", "who", "when", "where","how", and true or false questions from the information in a reading selection.

LEARNING RESOURCES

Basic Reading Skills and answer key.

Better and Faster Reading and answer key.

LEARNING ACTIVITIES

1. Start your work for this Item using Basic Reading Skills. Do the reading and exercises on p. 74-78. Mark your work as you go along. Then, do p. 85-88 and 91-93. Now, go back to p. 70-73 and do the work there. You should have a good idea of how to find the main ideas and important details. For review, do the 'Check Yourself' exercises on p. 79 and 94-5. If you got 90% or better on both these exercises, you can go on to Item Progress Check IV B, Form 1. If not, review the exercises before going on to Item Progress Check IV B, Form 1. Remember to check with your instructor before you write the Item Check.

If you made the criterion, go on to the next Item you need work on. If not, work on the following exercises until you have mastered the objectives.

BEST COPY AVAILABLE

2. a. For this section, you will use Better and Faster Reading. This book contains many exercises as well as explanations, so practice each section thoroughly. Read p. 102 and do the exercises on p. 102-105. Mark your work. If you got less than 10 correct on the 5 exercises, do the exercise on p. 124-5 for more practice. If not, go on to the next work outlined.

b. Now, read p. 113-116. Theis tells you more about main ideas and looking for details. Do the exercises on p. 117-121 and p. 129-133. If you made less than 3 errors on either set of exercises, go on to the work outlined at (c) If you made more than 3 errors, do the exercises on p. 126-9, 133-136 and 145-149 for more practice.

c. Review your work by doing part III, p. 167-170.

d. Better and Faster Reading also contains some exercises similar to those in S.R.A. and you can use these for practice before doing the Item Progress Check. Read the story and do all the exercises. Calculate your %. Use this chart to keep track of your scores.

Page	Title	% Main Idea	% Details
3	Look What's Back!		
17	Peering Into the Smallest World		
121	India's Wolf Boy		
173	Language's Curious Couples		
311	Making America Beautiful		
317	Why "Thinking Machines" Cannot Think		

When you get 75% or better on both parts of a selection, you are ready to do Item Progress Check IV B, Form 2.

Communications Item Progress Check

UNIT IV: READING Name: _____

ITEM B: BASIC COMPREHENSION Date: _____

Form 1

Criterion:	26 /28
Score:	___/28

(2)1. Read the selection and write the main events in point form and in sequence.

The farmers of Kerrobert regard themselves as sharp-witted and their neighbors in Melfort as quite the opposite. They tell this story.

An old woman of Melfort was looking out of her window and saw a neighboring farmhouse in flames. Knowing that the owner was ploughing a nearby field, she sent her grandson to tell him. The raced over the clods of newly turned earth, screaming at the farmer, "Your house is on fire! Your house is on fire!"

The farmer halted his horses, waited a moment until the news penetrated his brain, looked horrified, and then an idea reaching him dimly, slapped his pocket, and cried out in great relief, "It's all right. Here is the key in my pocket."

_____

_____

_____

_____

_____

_____

_____

(5) 2. Write the main idea of each paragraph below. Use the space provided at the bottom of the page.

a. What Is Money?

We think of money as shiny coins or crisp new bills, but money in different times and different places has taken strange forms and shapes. Can you imagine how difficult it would be to carry seashells, bricks

b. At one time in the South Pacific islands, only a strong man could handle the money. This is because stone wheels served as money. It took muscle to move a huge stone.

c. In ancient Greece oxen were money. One ox was the basic money unit. Even when gold and silver coins were used, they were still thought of as fractions of an ox.

d. In ancient Rome a variety of things were used as money. The emperors issued gold and silver coins and pieces of copper and bronze which were not made into coins but had to be weighed each time they were used to buy something. One of the emperors even used salt to pay his soldiers.

e. Anything can be used as money. The important thing is how it is used and what it represents. What material money is made of is not important at all. People may use as money anything they wish, provided that the whole society agrees it has the same meaning and can be used as exchange for goods and services.

a. _____

b. _____

c. _____

d. _____

e. _____

(5) 3. After each pair of sentences or clauses write C for the cause and E for the effect.

a. _____ The child had soft teeth and bones

_____ He was not given enough foods rich in calcium.

b. _____ Oil spilled from the hole in the side of the boat.

_____ After it had hit the shallow rocks.

c. _____ The men at the plant were angry.

_____ They did not get the raise in pay they had asked for.

d. _____ After it had caught the scent of the man.

_____ The deer turned and ran into the forest.

e. _____ The book was boring

_____ Jack laid it on the table and went out to play catch.

(6) 4. Read this paragraph and then list the ways in which the earth is different from the moon.

The Earth and the Moon

In many ways the moon is very different from the earth. For one thing it is very much smaller than the earth. About fifty balls the size of the moon could be put in a ball the size of the earth.

People could not live on the moon. The most important reason why is that there is no air to breathe on the moon. People, animals and plants cannot live without air. This is why there is no life on the moon. The moon would also be uncomfortable for people because it is so hot during the day and so cold at night. You could never keep warm at night on the moon.

Because there is no air on the moon, there is no life. There are also no clouds, rain or moisture. That is why no rivers or lakes exist on the moon. The moon is a bare, dry, rocky place.

(10)5. Read these paragraphs carefully and then follow the directions given on the next page.

Some Facts About Bananas

Most Canadians enjoy eating bananas, but very few of us have seen them growing. Bananas grow on huge plants that sometimes grow as high as twenty-five feet. The leaves are also large, and may be over ten feet long. They protect the plant from the hot sun.

Banana plants are not planted from seeds. New plants grow from small shoots at the side of the banana plant. The new plant grows very quickly. When it is about nine months old the blossoms appear. Each plant has one cluster of flowers from which one bunch of bananas grow. They look to us as if they are growing upside down. In three months the bananas are cut from the plant while they are green, and they ripen as they travel to where they will be sold. After the bunch of bananas is cut, the plant dies and the new shoots grow up to take the place of the old plant.

- - - - - - - - - - - - -

On the next page you will find six statements. Some are true, some are false. Put an F beside the ones that are false and a T beside the ones that are true. Do not look back at this page. There are four questions to answer. Answer the ones you can in the space provided. Leave out what you don't remember. Do not look back to answer the questions.

5. continued.

a) TRUE OR FALSE

_____ 1. Bananas grow on little trees.

_____ 2. Bananas are planted from seeds.

_____ 3. The leaves protect the banana plant from the hot sun.

_____ 4. Each plant has several bunches of bananas.

_____ 5. A new banana plant grows quickly.

_____ 6. Bananas grow upside down.

b) Answer in a sentence.

1. What happens to the banana tree after its bunch of bananas is cut?

_____

_____

2. What color are the bananas when they are cut from the tree?

_____

_____

3. How does the new banana plant begin to grow?

_____

_____

4. How long does it take bananas to grow from a new shoot?

_____

_____

Communications Item Progress Check

UNIT IV: READING Name: _____

ITEM B : BASIC COMPREHENSION Date: _____

Form 2

Criterion:	21/ 25
Score:	___/ 25

(5) 1. Write the main idea of each paragraph below. Use the space provided.

a) Most people at one time or another are faced with the need of finding a job. Today, with industry changing rapidly, people are changing jobs often. Many people do not know how to go about getting a job. They do not know how to sell their ability on the labor market.

_____

_____

_____

_____

b) There are techniques which can be learned to help people find a job. The first step is to analyze your experience and ability. This is difficult but it is important for you to know what you can do before you can convince someone else to hire you. Some questions you can ask yourself to find out what you can do are: What equipment can I operate? What jobs have I done? Which job did I enjoy most and do best at? If you can answer these questions you will have a good understanding of your ability. Then you will be better prepared to explain your experience to a prospective employer.

_____

_____

_____

_____

c. Somewhere in the dim past man learned to make different sounds with his lips and tongue, and to give each sound a meaning of its own. These sounds enabled him to express his needs and desires to others. He had learned to talk and communicate with his neighbors. During this time he began to make pictures of the things he knew on the walls of caves. Many old drawings have been discovered in Europe. They are clever pictures of animals, and men hunting with weapons. Through these scenes, which are a record of his time, he has communicated to us, who are far from when and where he lived.

d. Canadians eat too much white sugar. Doctors have told us that this habit is bad for our health. In some other parts of the world today thousands of children have never seen white sugar or eaten candy or cake or other desserts sweetened with white sugar. They eat natural sweets such as fresh fruits, dates, dried grapes, figs, and honey. The Arabs' sweets are dates and several other kinds of fruits. People who have always had natural sweets like them better than candy, cake and other foods made with white sugar.

e. Experiments with animals show which is better for growing children - white bread or whole wheat bread, milk or meat. Some white rats were put on a diet of whole wheat bread and whole milk when they were quite young. Their brothers and sisters were put on a diet of white bread and meat. For a few weeks all the rats grew very well, then a change took place. The rats living on white bread and meat began to look different from their brothers and sisters. They were smaller. Their fur was rough and ugly. Later their legs became so bent they could scarcely walk. But the rats that had plenty of whole wheat bread and milk grew big and lively. Their eyes were bright. Their fur was smooth and shiny.

(2) 2. Read the selection and write the main events in point form and in sequence.

a. The Unlucky Trapper

The air was frosty and the snow lay deep and cold around Joseph Whitehill as he looked at his last trap. He had tended a lot of them during the four days he had been on his trap line. With a discouraged slump he shouldered his almost empty knapsack and bent down to adjust his snowshoes. As he did so, he discovered that the lacings were almost worn through. Growling to himself Joseph headed into the bush in search of some willow branches. He was very tired.

A week later Joseph set out again on his trap line. The first trap was sprung, and what was left of the carcass of a rabbit lay shredded beside the trap. Clearly in the snow he could see the footprints of a large mink. Joseph Whitehill dreaded what was ahead.

_____

_____

_____

_____

_____

(5) 3. After reading each paragraph, write what happened (effect) and why it happened (cause).

a. Buddy was muttering softly to himself. The wrench had slipped and he skinned his knuckles.

i. Cause: _____

_____

ii. Effect: _____

_____

b. Ed was black with oil from head to foot. While changing the oil in his truck, he had accidentally knocked over the pan of used oil.

i. Cause: _____

_____

ii. Effect: _____

_____

c. Bill looked at his face and shoulders in the mirror. They were bright red, and covered with blisters. He had never had such a bad sunburn as he had got the day before.

i. Cause: _____

_____

ii. Effect: _____

_____

d. The score was tied 2 to 2. Then Bobby Hull scored a goal! The coach and team were very excited.

i. What happened? _____

_____

ii. Why? _____

_____

e. It was time for lunch. The secretaries said it was too cold to go out. They asked the boss to bring back sandwiches.

i. What happened? _____

_____

ii. Why? _____

_____

(4) 6. Read this paragraph and then write all the details that support the underlined sentence.

There are ways for people who are shy to overcome their shyness. A shy person cannot force himself to be comfortable with people, but if he tries to forget about himself and concentrate on other people, it will be easier. The world needs good listeners. A shy person can become a good listener and maybe even learn something as well. If shy people feel they don't have anything interesting to say, they can ask other people about themselves. People who are not shy love to talk about themselves. Maybe the person who is shy may even find he is glad to be that way.

(6) 4. Read this story carefully and then follow the directions at the bottom of the page.

Yesterday's Doctors

Although the practice of modern medicine is world-wide, until recently there were still places where the tribal doctor was a medicine man. Medicine men used various methods to cure their patient, or a combination of methods.

Many of these "doctors" made medicinal brews from herbs, spices, and juices. Sometimes the brew was so concentrated that it was thick, black and strong smelling. Other brews were clear, light and fragrant. Not all of these brews were potions for drinking. There were the ones that were rubbed on parts of the sick person's body.

Two methods used by medicine men to drive the disease out of the sick person's body were dancing, and singing or chanting. The dances were often performed to scare off evil spirits. Chanting was used to scare off disease-causing evil spirits or to ask help from good spirits or certain gods.

Some medicine men tried physically to force the disease or evil spirit out of the sick person's body. Examples of this were when the medicine man, attempting to drive out disease, vigorously massaged or pounded on the siling part of the person's body, or when he pinched or punctured parts of the person's body where the disease was believed to originate.

On the next page you will find six statements. Some are true, some are false according to the information in the paragraph. Put an F beside the ones that are False and T beside the ones that are True. DO NOT LOOK BACK.

____ a. The medicine man usually had one way to cure his patients.

____ b. Medicinal brews put the medicine man in a trance.

____ c. Not all the brews were for drinking.

____ d. Dancing and chanting were supposed to drive out the evil spirit.

____ e. Some medicine men used physical force.

____ f. Good spirits were asked to help.

(3) 5. Read the paragraph and answer the questions.

The question of conservation of wild animal life in our province is one which affects everyone. Originally, when our prairies and forests had an abundant supply of game, we acted as if it would never run out. The coming of the white man with his firearms changed all that. The buffalo was slaughtered by Indians and white men until it became almost extinct. For years the pioneers killed antelope and elk for their meat supply. When the antelope and elk were shot solely for their antlers, they became scarce. The result of this lack of conservation of our wild life has resulted in the severely reduced amount of game we have today. This wholesale destruction of wild life has almost upset the balance of nature. The important question now is, how do we keep the balance from tipping - in the wrong direction.

a. Who and what diminished the supply of wild life?

_____

b. Why were the antelope and elk killed?

_____

c. What is the meaning of conservation?

_____

COMMUNICATIONS

UNIT IV: READING

ITEM C : AUTHOR'S PURPOSE

OBJECTIVES

The student must be able to:

1. State the purpose of a reading or media selection as being to inform, persuade or entertain.
2. Identify statements in a given selection that support the author's purpose.
3. State the author's bias in a given selection.
4. Identify statements and/or assumptions that support the author's bias.
5. State the audience appealed to in a given selection

LEARNING RESOURCES

Basic Reading Skills and answer key

Better and Faster Reading and answer key

English III

Writers in Conflict

LEARNING ACTIVITIES

In this item, you will examine reading and media selections critically. Rather than being satisfied with an article or television presentation just because its entertaining, you should look at the reasons it was written and the ways in which the article is supported. Does the author make false or misleading statements?

Is the article designed for a specific audience and purpose? Think about these things as you read; they may change your mind about an article.

1. Read Basic Reading Skills page 119 and do the exercise. As you do it, think about pinpointing a specific statement in each paragraph - one that supports your interpretation.

2. Read and do the exercises on page 136, 110, 112, 115 and 121 of Basic Reading Skills. These exercises will help you make more accurate evaluations of a reading selection.

3. Read through pages 217-223 in Better and Faster Reading. As you read, keep your objectives in mind. How do the things you are reading about help you to identify bias in a selection? In what ways may an author support his bias? Is he always misleading?

4. To practice your objectives - to see whether you have mastered them, use the readings given in Writers in Conflict. Read the two articles on page 40-41 and compare them by answering the following questions.

    a) Which of the author's would appear to be the better (the most qualified) source of information?

    b) What is each author's purpose?

    c) In what ways does the author support his purpose - find statements that back up your evaluation.

    d) Determine the authors' biases and find statements to support your view.

    e) To what prospective audience do each of the articles appeal to? Would everyone read both? What audiences were arrived at?

Examine and answer the questions at the bottom of page 41 also. To mark your answers, compare them with those of your fellow students who have done the work. You may want to discuss your answers, particularly if you disagree. Evaluation of this sort does not always have a right and/or wrong answer.

Communications Item Progress Check

UNIT IV: READING Name: _____

ITEM C: AUTHOR' PURPOSE Date: _____

Form 1

Criterion:	18 / 20
Score:	___ / 20

(10) 1. For each passage below, say whether the author's purpose was to inform, persuade or entertain. Then explain your reasons for selecting that purpose.

a. As a driver you can learn to drive defensively by applying certain rules to prevent accidents. Try to foresee accidents before they happen. Look ahead and think of what hazards there may be. Don't just assume that everything will be all right. If a dangerous situation arises, have your defense planned and act immediately. Keep alert. Think of where you could turn or how soon you could stop to prevent an accident.

The author's purpose was to _____

Reason: _____

_____

_____

b. The Western meadowlark differs from the Eastern meadowlark only in song. They are both about the size of a large robin. Both birds have a striped brown back, a lemon-yellow throat, a black band at the neck, a long bill, and white outer tail feathers. The Western meadowlark, with its distinctive song, can be found only west of the Great Lakes.

The author's purpose was to _____

Reason: _____

_____

_____

c. Ever since man first learned to use fire, his life has changed every time a new form of energy has been discovered. Other discoveries of ways to use energy which have changed man's way of living are: use of animals to carry loads, the steam engine, the electric generator and the internal-combustion engine. Today man is finding all kinds of ways to use atomic energy. Who knows what the energy of the future will be?

The author's purpose was to _____

Reason: _____

_____

_____

d. An old lady named Elsa Baker came into my office one day to apply for her old age pension. She didn't have any way to prove how old she was. And the local courthouse that had a record of all the early births had burned down years ago.

Finally, I had an idea. I wrote to an old man who used to work in the courthouse many years ago. He knew everybody in this area. He was able to settle the question for me in this way.

"I don't know for sure how old Elsa is, but I think she was born around 1906. In 1914 we used to live near her farm and she used to bring us our eggs. I always pulled her pigtails. So she must have been about eight then to be big enough to deliver eggs but not big enough to sock me.

The author's purpose was to _____

Reason: _____

_____

_____

_____

e. There are two men who work in important positions in the office where I am a secretary. Everyone enjoys working with Mr. Freed but no one likes Mr. Sauer.

Mr. Freed is always thoughtful and considerate. When he wants something done, he'll ask, "Would you mind getting this information for me please?" Mr. Sauer is just the opposite. He usually shouts across the room, "Get me the memo, and hurry up." I usually work hard to get Mr. Freed's work done and often I will retype a letter if it is not perfect. Mr. Sauer just makes me feel frustrated. I usually leave his work until the end because I know he will find fault with it anyway.

The author's purpose was to _____

Reason: _____

_____

_____

f. The maple is a handsome tree which grows in many parts of Canada. It is a useful tree from which we get maple syrup and a valuable wood used to make fine furniture. Maple trees furnish welcome shade along many of our streets. People find pleasure in their beautiful leaves and strange, winged fruits. In fact, Canada has chosen the maple leaf as its emblem.

The author's purpose was to _____

Reason: _____

_____

_____

_____

(8) 2. Read the "Letters to the Editor on page 129 of Writers in Conflict. For each letter, identify the author's bias, (Notice who wrote each letter) and support your interpretation.

(2) 3. Read pages 65-69 in Writers in Conflict. What is the author's specific purpose in these pages and, to what audience is he speaking?

Communications Item Progress Check

UNIT IV: READING Name: _____

ITEM C: AUTHOR'S PURPOSE Date: _____

Form 2

Criterion:	15/18
Score:	___/___

(10) 1. For each passage below, say whether the author's purpose was to inform, persuade or entertain. Then explain your reasons for that choice.

a. Chances are your family isn't getting enough of the right kind of foods every day. There is something you can do to solve all your nutrition problems. Give your family a tablespoon of Neutraday every morning and you will never have a nutrition problem again.

The author's purpose was to _____

Reason: _____

_____

_____

b. If our great-grandparents could suddenly come alive again, they would be amazed at the changes in travel in Canada. In their day, walking and riding on horseback were the fastest ways to travel. Today jumbo jets can carry close to three hundred people across the continent in a few hours. Most of us use cars, buses, and trains to get us from one place to another. Some of us may even fly. The early planes in the 1900's were single engine machines that carried one person; now we have machines that travel many hundreds of miles per hour. Who knows, maybe our grandchildren will be taking their vacations in outer space.

The author's purpose was to _____

Reason: _____

_____

_____

c. "Censor Mass Media Urges R.B. Tough"

A world-famous writer said today he felt that the lack of censorship in Canada benefitted the communists. He feels that the mass media in Canada advertise wrong sex relationships, excessive drinking and the emphasis on youth. This, he says, gives the communists material for propaganda because it makes our society look bad. Censorship, he believes, is in the interests of morality and the preservation of the family. He added he had no idea how censorship might be controlled.

The author's purpose was to _____

Reason: _____

_____

_____

d. Charley Reid and Dave James have to take their wives to a movie tonight. The wives, Marsha Reid and Anne James, get to choose the movie.

Charley and Dave would rather stay home to play cards and drink beer. However, Marsha and Anne had won a bet and they intend to collect. The two husbands bet the two wives that they would beat them at cribbage. What Charley and Dave did not know was that Marsha and Anne had been taking cribbage lessons.

The men's mouths were watering because they were sure they would win. Their prize was to be treated like kings for a whole weekend with the wives cooking their favorite food, serving them breakfast in bed and waiting on them hand and foot all weekend.

Charley and Dave were the lunch hour champions at work. Imagine their surprise when the wives beat the socks off of them!

The author's purpose was to _____

Reason: _____

_____

_____

e. It was a while before I realized I was alone on the street. There was not even a shaft of light from the houses that lined the block like quiet, still sentinels. I heard the man before I saw him - slow, deliberate footsteps. He made no effort to muffle them. The dark figure moved towards me. He moved slowly and with a quiet power. When he came under the street light, I saw a lean, hard face. His eyes were almost hooded in the shadow of his hat brim. But I could see them - endlessly searching from side to side, watching. A sudden chill struck through me as I caught his glance and saw the menacing power in his eyes.

The author's purpose was to _____

Reason: _____

_____

_____

_____

f. Master of Ceremonies: "I would now like to introduce our dear friend Curly Brown."

Completely bald Mr. Brown coming to the microphone says: "Thank you very much, Mr. Chairman. We have always heard people say that you are a wit. Now we know that they are half right."

The author's purpose was to _____

Reason: _____

_____

_____

_____

(8) 2. Read the article by Jerry Rubin on page 91 of Writers in Conflict? What is this author's bias? What is he for or against? Support your view. What audience is he aiming his article at? Answer these questions in 5-7 sentences.

UNIT IV: READING

ITEM D : FACT AND OPINION

OBJECTIVES

The student must be able to:

1. Define fact and opinion.
2. Identify given statements as being fact or opinion.
3. Select his opinion from two contrasting points of view and support the choice.
4. Write his opinion on a given article, either agreeing or disagreeing and support his opinion
5. Write his opinion on a given issue, and support the opinion with relevent details and arguments.

LEARNING RESOURCES

Basic Reading Skills and answer key
Better and Faster Reading and answer key
Writers in Conflict

LEARNING ACTIVITIES

1. Read Basic Reading Skills and do the exercises on page 106-107.

2. Read the two paragraphs below. Briefly state which opinion you would most readily accept and support your choice. Keep your work to hand in with the Item Check.

a. A doctor's viewpoint.

Parenthood Should Wait

There are a number of very important reasons why young couples nowadays should delay starting a family. With so many marriages ending in divorce and so many children suffering the ill effects of divorce, a couple should give their marriage a five year trial. If the marriage is strong and happy, then children will be a blessing, not a burden. If the couple wishes to part, then no children will be involved. When a couple waits for a five year trial period, they can get to know each other better and build a strong loving relationship. They can develop shared interests and the wife can work to establish a strong economic base. Children cost money after all. Then a couple will be mature and loving enough to enjoy their children together.

b. A young mother's viewpoint.

Parenthood Should Not Wait

Who does Dr. Smith think he is? I didn't want to wait until I was old and grey before I had my family. I have four small children, I am in my twenties, and I am enjoying life! Who needs a lot of money to raise children? Children need love and attention; they do not need a lot of toys and possessions. Our marriage is stronger and closer because of the shared joys and tears. And after all - that's what life is all about. I wouldn't trade my four for all the money, careers and fame in the world.

3. Now, read the following passage. You must again take a stand, either you agree with the author or you disagree. Select your response and write a brief paragraph in support of it. Again, keep this as you will hand it in with your Item Check. Again, you may wish to discuss your responses with other students.

Welfare in Canada

The welfare mess needs total reform. The welfare machine is headed towards complete breakdown because it can't help people "humanely". And working people are getting mad. They have to support welfare programs and they feel that welfare is failing.

Welfare is a tangle of programs for the poor who, because of age, sickness, handicaps or lack of ability and training, can't get jobs. The system is full of inequalities and injustices. The present set-up almost encourages people to remain on relief. Those who do get jobs often get less money than when they were on welfare, and they lose some of the other benefits. Why should they want to work?

You are now ready for the Item Progress Check, Form 1. Think carefully as you do it, and be ready to support your opinions on various topics. If you made the criterion, go on to Item E. If not, do the following until you have mastered the objectives.

4. Do the exercises on page 108-109 of Basic Reading Skills. Do also page 218-9 of Better and Faster Reading. Mark your work carefully.

If you have done the work thoroughly, you can distinguish between fact and opinion. Now, you will have to express opinions of your own. This is not usually the problem. The problem lies in supporting your opinions. Choose your supporting arguments carefully.

5. Read page 217-223 in Better and Faster Reading. These pages explain some of the common methods used to support arguments. Some are obviously better methods than others. When you prepare your argument, make sure you avoid the weak methods of supporting your opinion. Keep these readings in mind and check your work for its logical and factual basis. Opinions supported by facts and logic are more acceptable and viable than those supported by reason.

6. Read the two paragraphs below. Briefly state which opinions you would most readily accept and support your choice. Keep your work to hand in with the Item Check.

Cash or Instalment Buying

Opinion #1

Buying on instalment plans is the best way for young families to get the things they need. If you have a steady job and a good credit rating, you can have the things you need and pay for them while you use them. Sure, it costs more when you add the finance charges, but it's worth it. Governments and businesses pay for things like schools, roads and equipment on borrowed money, so why shouldn't individuals?

Opinion #2

Instalment buying makes very poor sense. Proper budgeting of your money and a little patience will allow you to save to buy the things you need. The costs of financing in instalment plans is very high. For instance, the interest you pay when buying a new car would almost pay for a new color TV. Don't forget also that while you are saving to buy the things you need, you earn interest at the bank instead of paying it out. And it sure is nice at the end of the month not to have all those payments to make. Paying cash is the sensible way to buy things.

7. Now, read the following paragraph. You must again take a stand, either you agree with the author, or you disagree. Select your response and write a short paragraph in support of it. Keep your work to hand in with Item Progress Check, Form 2, which you should now be ready to do.

Censorship

Its about time that our elected officials took steps to enforce the laws on dirty books and films which are available today. You can't walk by a newstand any more without seeing magazine covers showing sex and violence. Our movies are not fit for our young people to see, as full as they are of foul language and violence. It's no wonder that people are turning away from leading moral lives and losing respect for their parents, the schools and the church.

Read over the objectives and think carefully about them. Think of examples from television, radio and newspaper articles as well. Can you explain the purpose and bias in some programmes or readings you have seen?

Now, do the Item Progress Check, Form 1, for this item. If you make the criterion, go on to Item D, if not, continue work on the following, until you feel that you have mastered the objectives.

5. Read and do the exercises on pages 120, 122-3, 111, 113-4, 116-118 and 137 of Basic Reading Skills.

6. Reread the pages assigned in number three, from Better and Faster Reading. Do the exercises found there and on page 224-5 and page 254-5 (# III, and Review Quizzes on Magazines).

7. Read English III page 186-192 and 201-213. Pages 209-213 have questions for you to answer. Do numbers 4,7,9,10,12,15,17,18, 21,22. You don't have to do all the questions, but at least think over each one carefully.

8. Now, read the two articles on page 123-5 in Writers in Conflict and compare the two articles. Write up your answers to the following questions.

   a) What are the authors' purposes?

   b) What audiences are these aimed at?

   c) Which article best supports the point of view of the author? Find statements to support your view.

   d) What bias can you find in the articles.

   e) Which author is probably more qualified.

You should now be ready for the Item Progress Check, Form 2 If you do not feel ready, re-examine the objectives and readings until you are prepared to do the test.

Communications Item Progress Check

UNIT IV: READING Name: _____

ITEM D: FACT AND OPINION Date: _____

Form 1

Criterion:	23/ 25
Score:	___/ 25

(1) 1. What is a fact? _____

_____

(1) 2. What is an opinion? _____

_____

(7) 3.

Read this article from a magazine on "How to Handle Your Money Problems", and write F for Fact or O for Opinion after each sentence.

"How to Handle Your Money Problems"
by: I.M. Rich

Money is the root of all evil. ___ I get most of my letters from people who have money problems with their friends or spouses. ___ You should never lend to a friend if you want him to stay a friend. ___ If you do, you would be smart to put it on paper in a businesslike manner. ___

Some wives do all the shopping for the family. ___ They buy the food and pay the bills. ___ Women are more sensible about spending money than men are. ___ They should always handle the family budget. ___

(3) 4. Read these 2 opinions and select the one you most agree with. Support your choice.

Strikes

Opinion #1

Strikes should be outlawed. If a person works for a company, he has agreed to accept the job and do the work. If he doesn't like the way his employer is treating him or if his pay is not satisfactory, he should resign.

The public just should not have to put up with strikes. Strikes cost the country enormous amounts in lost productivity and even loss of markets for our products when we can't deliver what has been promised. The best thing would be to outlaw strikes and then try to solve the problem by another method of ensuring that workers have a rightful share in their productivity.

Opinion #2

The only way a group of workers can make an employer take notice of their demands is to stop work. If the workers stop working, the products are not being made or the service is not being given. Then if the employer wants to stay in business, he has to settle the strike by making an agreement which satisfies the workers. After all, if it weren't for the workers, no goods or service would be produced; therefore they must have the right to strike for better wages and working conditions. The answer to the whole problem is to make it a lot easier for workers to strike at any time they are not satisfied.

(3) 5. Read the following and state your opinion of it.

Chemical Crop Sprays

The use of man-made weed and insect killers has made a great improvement in the farmer's ability to produce more wheat and other agricultural products.

Farmers are fully justified in using these sprays even though they kill some small birds and animals, and even though the residue stays on the fruit we eat and can build up in our bodies over a long time.

Almost every improvement man has made in his method of food production has some disadvantages. What we have to look at is the advantages and not get emotional about killing a few birds or fish. The answer is not to ban all these chemical sprays but to continue to look for new ones which will keep all the advantages to the farmers and stop doing damage to the environment.

(4) 6. Write your own opinion, with support of either of the following topics:

a) Women's lib is a waste of energy

or

b) Police need more public support.

(6) 7. Hand in the two assignments you did (#2 and #3) for the Learning Activities. Staple them to this Item Progress Check.

Communications Item Progress Check

UNIT IV: READING Name: _____

ITEM D : FACT AND OPINION Date: _____

Form 2

Criterion:	19 /22
Score:	/22

(1) 1. What is a fact? _____

_____

(1) 2. What is an opinion? _____

_____

(7) 3. Classify these statements as fact or opinion. Put F or O in the blank.

____ a. Hank hit a home run.

____ b. It's going to be cold tomorrow.

____ c. Love is happiness.

____ d. There ought to be a law against lying.

____ e. The instructor said that somebody had broken a window.

____ f. You should not cheat on tests.

____ g. Paris is not the capitol of Canada.

(3) 4. Read these 2 opinions and select the one you most agree with. Support your choice with at least two reasons.

Opinion #1

The money being spent building space vehicles and going to the surface of the moon to fish up a few stones would be much better spent on hospitals, schools and new medical research. Certainly some new discoveries have been made which are useful for the military and some have resulted in new products for consumer use, but these could have been discovered anyway. We should use our intelligence and money to improve life on earth for all the people and never mind the moon. It's a waste of money and energy.

Opinion #2

Space research has had the greatest effect in the history of the world. Many people have complained about the needless cost, but compared to all the money in circulation, the expense has been small indeed. If we had not spent the money on space research, perhaps no other new program would have been carried out. Space research has had important effects on all our lives. Scientists have discovered new materials using plastics and alloys, and they have invented new electronic and communication devices which in the near future will be available for business and personal use. The space industry has created thousands of jobs and whole new cities to carry out all the space projects. The results may not seem worthwhile now, but people the world over will feel for many years the benefits of space research to put a man on the moon. To go into space was definitely the right decision.

(4) 5. Write your opinion on either of the following topics. Support your views.

a. Day care centres are unfair to children; they need their own mothers.

or

b. Companies who hire unskilled workers should not base their choice on educational background.

(6) 6. Hand in the work you did for #6 and #7 of the Learning Activities for this Item. Staple your work to this Item Check.

COMMUNICATIONS

UNIT IV: READING

ITEM E : ADVERTISING

OBJECTIVES

The student must be able to:

1. Classify advertisements as based mostly on fact or mostly on opinion and support the classification.

2. Identify propoganda devices used in advertising.

3. Identify which propoganda device is being used in a given advertisement or statement.

LEARNING RESOURCES

Better and Faster Reading and answer keys.
English III (answers in book)
Newspapers and magazines
Writers in Conflict

LEARNING ACTIVITIES

* As you do this item, you should take some time to read through the articles on page 133-144 of Writers in Conflict. These articles deal with the question of why we have advertising at all and what use it serves. You will probably find them very interesting and they will help you to understand advertising.

1. Read page 192-199 of English III for an explanation of the propoganda devices. Pay special attention to the examples given for each device. Make notes if necessary, so that you do not confuse the different devices. When you are certain that you know each type - do the excercise on page 199-201. Don't look back at the explanations until you have completed the exercise. Mark your work using the explanations and then, consult the answer key at the end of the chapter.

2. With the exercise that you just completed, examine each paragraph to see whether it is based mostly on fact or mostly on opinion. Remember that a fact is not necessarily true, but rather something that can be proven true or false. The answers appear at the end of this learning activities sheet.

Now, do the Item Progress Check, Form 1. If you make the criterion, do the Unit Progress Check Form 1. If not, do the following exercises.

3. Read Better and Faster Reading, page 224 (omit the device of Flattery) and then do exercises I and II on page 224-5. Consult other students about the samples you selected for #2.

4. Do also exercise # 19 on page 212 of English III. (The answers are on page 214-5.) Now, review all the work you have done for this Item and if necessary, look over the work from Item D as well. It is about seperating fact from opinion.

You are now ready to write Item E Progress Check, Form 2. Remember to staple your work to the Item Progress Check when you have finished it.

Answers. English III, page 199-201 (Fact or opinion)

1. mostly opinion
2. mostly fact
3. mostly fact
4. mostly opinion
5. mostly opinion
6. mostly fact
7. mostly opinion
8. mostly opinion
9. mostly fact
10. mostly opinion

Communications Item Progress Check

UNIT IV: READING Name: _____

ITEM E: ADVERTISING Date: _____

Form 1

Criterion:	18/20
Score:	/20

(4) 1. Read these advertisements and tell whether they are based mostly on fact or mostly on opinion. Support your choice.

a. Yummy Foods is proud to introduce its new line of gourmet ideas. Now the world's best loved foods are available to every homemaker. For the first time delicious, nutritious, international meals are available in minutes.

_____

_____

_____

b. This stereo unit has all the most wanted features: volume, tone and balance controls, digital track indicator, fast forward button, repeat switch and fine tuning control.

_____

_____

_____

c. Come see this feature film on wild life in Africa. Watch elephants fight, crocodiles snatch their victims, and snakes swallow animals larger than themselves - all in the natural wild surroundings of a tropical jungle.

_____

_____

_____

d. Drop in at Fantini's for the tastiest food in town. Our steaks are the thickest and juciest you'll ever see, and our fresh-from-the-ocean sea foods will give you the tang of a seashore breeze. Phone for reservations.

_____

_____

_____

(8) 2. Match each propoganda device with the best explanation of it.

a. Card Stacking	_____	a well known person supports the product
b. Testimonial	_____	every body uses it
c. Transfer	_____	its for everyday folks
d. Name Calling	_____	tells all about the good points
e. Glittering Generalities	_____	associates product with ideals that we all know and love
f. Plain Folks	_____	negatively 'charged' words used to describe other product
g. Band Wagon	_____	positively 'charged' words used to describe product

(8) 3. Name the propoganda device or devices being used in each of the following advertisements.

a. For good old-fashioned home-cooking come to Mother Hubbard's Country House Restaurant.

_____

b. Mrs. Prolific has 13 children, and she says, "I just couldn't get through wash day without my Super-Whisper Quiet Automatic Washer."

_____

c. The Swing Crowd drink Fissly, the low-calorie, super refreshing soft drink.

_____

d. Canada needs her people to be strong. Eat Canadian beef to give you strength and energy for the hardest jobs.

_____

e. Nine out of ten people who have taken the blindfold test prefer the taste of Treetop Tulip Tea. Try some today.

_____

f. Miss Canada chosen as the loveliest girl in our beautiful country, has this to say about Lovy, the only soap she'll use on her beautiful skin.

_____

g. Scientific research has shown that NOSMO can help you stop smoking in just two weeks.

_____

h. Have people been avoiding you? You may be one of the many people who suffer from bad breath. Thousands of people are finding new hope with our product. Write to Box 4600.

_____

_____

Communications Item Progress Check

UNIT IV: READING Name: _____

ITEM E: ADVERTISING Date: _____

Form 2

Criterion:	16/20
Score:	/20

(6) 1. Identify fact and opinion statements in the following advertisement, by answering the questions.

Enjoy the cool comfort of travel in one of our luxurious Air Dominion planes. Three gracious hostesses are ready to greet you and to assure you of a safe, smooth flight. Our pilots keep you informed of weather conditions and other facts of interest. We have stops in every major city in Canada. There is one trip made every hour and a half from Ottawa to Toronto and every two hours to Montreal. The next time you plan a trip, won't you make flying your method of transportation?

_____

Answer the following questions with "yes" or "no".

a. Does <u>every</u> person who flies think airplane trips are comfortable?

_____

b. Are there other means of transportation which are also cool?

_____

c. Are airplane trips <u>always</u> smooth? _____

d. According to this article, are these trips made every two hours from Ottawa to Montreal?

_____

e. Can hostesses ensure that you have a safe flight? _____

f. Do pilots inform the passengers of weather conditions? _____

2. Name 6 commonly used propoganda devices.

_____ _____

_____ _____

_____ _____

3. Identify the propoganda device used in each of the following:

a. The best little boat around is Hunky Dory. It never sinks. It doesn't cost much and even a baby can run it.

_____

b. Would you like to go back and enjoy your childhood days? You can't, but make sure your children remember happy days. Buy them a Merry Goround, the newest toy for children.

_____

c. If Tilly Tassle, the famous model, uses Silkthread Shampoo - it's good enough for you.

_____

d. People everywhere in Canada are enjoying Milips, a guaranteed mild smoke.

_____

e. Grow them up great - and keep them that way with Frisky pet food, the only food that is good enough for your pet.

_____

f. Alpha - not just another pretty car. It's like a beautiful woman - lovely to look at. Drive an Alpha and you'll never drive another car.

_____

g. Are you out of the swing of things? Maybe you have iron-poor blood. Drink Pep every day and join the crowd again.

_____

h. When you are thinking about what kind of toothpaste to use, consider Whitespot, the toothpaste of 9 out of 10 movie stars.

_____

Communications Unit Progress Test

UNIT IV: READING SKILLS

Name: _____

Form 1

Date: _____

Criterion:	63 / 66
Score:	___/66

(12) Section A: In each sentence below, there is a blank space where a word has been omitted. Under the sentence, are several words, one of which best fits the context of the sentence. Write that word in the blank.

1. The bass fishing is good throughout the year, and is at its _____ from now until early summer.

peak completion goal beginning

2. Sciences almost always carry over into each other but not all discoveries made in one field will _____ all other fields.

influence govern penetrate dominate

3. The township was founded in 1732 and it is run today in _____ the same way it was then.

duly slightly directly virtually

4. Rising and sinking of _____ of the earth's crust causes earthquakes.

ingredients sections any series

For each sentence below, write a brief definition of the underlined word, as it fits the context of the sentence.

5. From his vantage point, he could see for several miles in any direction.

vantage _____

_____

6. He heard the plaintive cries of an animal caught in a trap.

plaintive _____

_____

7. He's very obtuse; I can't get him to change his mind and co-operate.

obtuse _____

_____

8. Don't blame him for his mistake; it was unintentional.

unintentional _____

_____

Write the following list of words in alphabetical order.

9. found foul foundry four fought
fountain foundling fond founder

_____ _____ _____

_____ _____ _____

_____ _____ _____

Find the following words in the dictionary and use each one correctly in a sentence.

10. trestle _____

_____

11. semblance _____

_____

12. remorse _____

_____

(15) Section B: In the space provided, write the main idea of each paragraph.

a) One out of every two people who drive will be involved in a serious accident at some time in their life. If you drive, you can help to prevent accidents by learning how to drive defensively. This means that instead of driving along thinking everything is going to be right, try to guess what could go wrong. Don't trust the other driver. Be prepared for him to make a mistake. If you are ready for an emergency, then you have a better chance of reacting in time.

_____

_____

b) The newspapers tell us every day that crime is increasing. What can be done to stop people from breaking the law? There are many things we can all do. We must start with our children and educate them to know right from wrong. We must provide good recreational facilities for our teenagers. Families in trouble must be able to get help and guidance from social services. This is only a start. Society must treat all of its citizens equally before crime will begin to decrease.

_____

_____

c) Most women cook vegetables for their families every day, but few women prepare them correctly. Green vegetables should be cooked uncovered and as rapidly as possible to keep the flavour and color. For that reason washed vegetables should be put in rapidly boiling water. All sweet-juiced vegetables, like peas, should be cooked in not more than enough water to cover them. In this way most of the water will have boiled away by the time the vegetables are tender. All of the food value will be in the vegetables instead of in the water, which some people throw away. Butter or cream added near the end of the cooking makes the vegetables taste still better.

_____

_____

4. Write the main events of the following paragraph in sequence, on the lines provided below the paragraph.

Hockey Night In Canada

It was the end of the third period, and the score was tied. Gordie Howe skated slowly out of the penalty box. It was his chance to get a goal and win the series. He felt he had to move fast while the other team still had a player in the penalty box. The referee dropped the puck for the face-off. Roger Crozier, the goalie for the Red Wings, got ready for action. Gordie Howe skated down the ice towards the opponent's goal. A team member passed him the puck. He was in direct line with the goal. He shot. He scored. The Detroit Red Wings won the series.

_____

_____

_____

_____

_____

_____

_____

Read each sentence. Decide which part is cause and which is effect and write cause or effect in the space.

5. i. When we are camping we love to wake up with the smell of coffee

_____

ii. and so Joe never forgets to bring coffee along

_____

6. i. Paul was able to take his family for a vacation

_____

ii. with the money he saved.

_____

7. i. The Gold Rush really started

_____

ii. when a man found a gold nugget in the Yukon.

_____

Under this paragraph, write the details that support the underlined sentence in the paragraph.

8. The King Trapper Festival promises to hold a variety of events for the spectators. The competition is shaping up as a "bang-up show" because so many new prizes and events are being offered. There will be two or three events going on at one time; there won't be time for a dull moment. The new events that have been added are: muskrat skinning, bannock baking and animal calling. All the old events from past years are on - from the power saw competition, to the bird calling. A buckskin parade will start the three-day festival off; and a barn dance will end it. Some lucky trapper will walk away with the $1,000 King Trapper prize.

_____

_____

_____

_____

Read the paragraph carefully,then follow the directions at the bottom of the page.

9.

Down through Victoria and Carleton counties, the river runs very fast, but peacefully. In spring the Atlantic salmon swim up through the swift waters to tributaries with Indian names like the Becaguimac and the Tobique, to lay their eggs. Fishermen catch them with fly rods, but nets cannot be used; there are too few salmon for that. On the high banks of the river in these two counties are some of the best potato fields in Canada. The soil and the climate are just right for growing potatoes.

On the next page you will find four statements. Some are true, some are false according to the information in the paragraph. Put an F beside the ones that are False and T beside the ones that are True. DO NOT LOOK BACK.

9. continued.

_____ a) The salmon swim upriver in the spring, from the Atlantic ocean.

_____ b) Victoria county is just right for growing tomatoes.

_____ c) Fishermen use nets to catch the salmon swimming up river.

Directions: Read the paragraph and answer the questions that follow.

10. Most people know that Columbus made a mistake when he first sailed to North America; he thought he had reached India. Who are the people that he called Indians? Scientists who study the historical migrations of people say that the ancient ancestors of North American Indians were Mongoloid. That does not mean that Indians are Chinese and that they came from China. The forefathers of today's Indians supposedly arrived in North America from Asia such a long time ago that China and the Chinese were not yet in existence. By comparison, the Chinese as a racial group are recent. Probably it is more truthful to say that both the Indians and the Asian peoples of today have common ancestors in the far distant past somewhere on the Asian continent. Nobody knows what changes and mixtures in race took place in the long thousands of years before the various races of mankind developed as we know them today.

a. Where did the early North American Indians probably come from?

_____

b. What was the big mistake that Columbus made?

_____

c. What was probably the racial origin of the Indians?

_____

d. What statements in the story support the idea that North American Indians are not Chinese?

_____

_____

_____

(12) Section C: For each of the following paragraphs, state the author's purpose. Briefly explain why you chose that purpose.

1. A cattle brand is usually made up of forms of letters, numerals, pictures or a combination of these symbols. A rancher makes sure that whatever symbol he chooses will make a good design and will be easy to read.

2. Your breathless letter arrived this morning, and to tell the truth, although it caused my coffee to get cold, I wasn't too surprised by it. Ever since you left home, your mother and I have had the feeling that you and Bob might want to get married this summer. And now you have told us.

3. When you are hiking you may wonder how you will carry your equipment. The best kind of pack is a haversack. It is light and convenient and will hold clothing and other articles. One blanket should be placed inside to keep the hard articles from hurting your back. Never use a dufflebag as it has no straps and cannot be carried on your back.

4. Do you think a marriage based upon a special type of perfume is likely to be a successful marriage? How much more popular is a girl likely to be just because she changes her hair color? These questions seem silly, but those are the types of ads we see on television. If we believed them, we would be foolish enough to think a girl can catch a husband simply by using a certain cosmetic. How important is it, after all, to have hands that look sixteen when you are a fifty year old woman?

Read the article on page 128 of Writers in Conflict. The article is titled "How much is 24 Billion". Briefly, outline the author's bias. (Is he for or against such expense?) Explain why you chose that answer. What audience is he trying to interest?

5.

Section D:

(15) 1. What is a fact?

2. What is an opinion?

Write fact or opinion after each of the statements in this paragraph.

3. Be Kind to Your Family

Most mothers take good care of their families._____ If you really care, you will give your family Mighty-Puffs breakfast cereal._____ There are two kinds to choose from, plain or sugared._____ Whichever kind you choose, your family is sure to love it._____ Mighty-Puffs are available at most supermarkets._____ So remember, mothers who are kind to their families feed them Mighty-Puffs._____

Read these two paragraphs and choose the one that you most agree with. Support your choice.

4. The Case Against Abortion

Abortion is a sin. We have laws against the taking of life at any age; society calls it murder! How much worse, then, is it to kill an unborn child before it has had a chance to see the light of day. A conceived child has the right to be born; he may be a genius. Women are irresponsible to allow themselves to become pregnant when they have no intention of having the baby.

The Case for Abortion

Any woman ought to have the right to decide what she does with her own body. The unborn foetus is just a part of the mother's body like any other organ; it is not a separate person until it is born. Arguments about murder are nonsense. A baby that is not wanted should not be born at all, especially when the world is already over-populated.

_____

_____

_____

4. continued

Read this selection and write your opinion of it. Support your views.

5. It is true I am an old man. I am not sad to be old. I am sad for all the young Indian people throughout this land. They have not known the Canada I have known. They have heard about it in stories at their grandparent's knee. They wish to go backwards in time, but they cannot. They wish to get justice for wrongs done before they were born, but they cannot.

They cannot go back to the time when the land was ours and gave us our needs. We cannot be free like the north wind and be Nature's children. We have been flung into the middle of the twentieth century. We must adapt or perish.

The young people must learn to tell the white man what we want. He says we do not know. He is wrong. We want to be respected; we want an equal opportunity to succeed in life. But we cannot do it on the white man's terms. We have to do it in our own way. It is up to our young people to find that way.

a. What is the speaker's purpose? _____

b. What is your opinion? _____

c. Write at least two details to support your opinion.

Write your opinion and support it, on either of the topics below. Remember you may agree or disagree with the statement.

6. a. The death penalty should be outlawed in Canada.

or

b. We shouldn't waste time by having elections.

(12)

Section E: Identify each of the following advertising statements as (F) based mostly on fact or (O) based mostly on opinion. Explain your answer.

1. Evening Coaching School for June Departmental Examinations. You may register in person at the Adult Education Division, Eastern Canada High School, Monday through Friday from 9 a.m. to 4:30 p.m.

_____ Why? _____

_____

2. Our roofing is available in many styles and colors. You can depend on it to be long-lasting and maintenance-free, to give your home top protection from the worst that Canadian weather can offer. Come and see us today.

_____ Why? _____

_____

3. No film has ever been made like it before! The most daring scenes of sexual violence the screen has ever known! Don't miss it!

_____ Why? _____

_____

Name 6 commonly used propoganda devices.

4. _____ _____

_____ _____

_____ _____

Name the propoganda device (or devices) being used in each of the following.

5. Get a new Flyer bike; all the kids have them.

_____

6. Miss Canada keeps lovely with Bee's Cream.

_____

7. Smoke Mildews: the mildest smoke with the finest tobacco!

_____

8. Your country needs your help. Be patriotic. Buy Canada Savings Bonds.

_____

9. When Rick Speeder hits the corners, he wants the best: nothing but Goodspare tires.

_____

10. Look around! You'll never find better prices, better products and better service than at Figby's Furniture Fair.

_____

Communications Unit Progress Test

UNIT IV: READING

Form 2

Name: _____

Date: _____

Criterion:	60/ 65
Score:	___/ 65

(12) Section A: In each sentence below, there is a blank space where a word has been omitted. Under the sentence are several words, one of which best fits the context of the sentence. Write that word in the blank.

1. A passenger on a train _____ the progress the train is making by watching the countryside roll by.

shares controls diminishes notices

2. A new clash is reported to have _____ between the countries sharing that border.

evoked erupted ejected penetrated

3. Algebra is necessary for many occupations; as is particularly _____ in professions like engineering.

overt outspoken obvious ingenuous

4. The _____ of an artificial lake in central Greece was responsible for a series of earthquakes in the area.

construction planning establishment formation

For each sentence below, write a brief definition of the underlined word, as it fits the context of the sentence.

5. You could easily strain yourself lifting those heavy objects.

strain _____

_____

6. His excuse for being late was hardly plaus ble, so he had to be counted absent for the time.

plausible _____

_____

7. You must stipulate the conditions you'll accept or be dissatisfied with what you get.

stipulate _____

_____

8. If someone is vociferous you can usually hear them, even in the next room.

vociferous _____

_____

9. Write the following list of words in alphabetical order.

paper-boy	papoose	paper	par
papaw	paper—birch	parable	park
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____		

Look up the meaning of each of the following words in the dictionary and use correctly in a sentence.

10. entourage _____

_____

11. homage _____

_____

12. cooper _____

_____

(16) Section B: In the space provided, write the main idea of each paragraph.

1. "Protein" is a word you hear often, but do you know what protein is and what it does? Protein is a substance found in milk, lean meat, cheese, eggs, fish, lentils and peanut butter. When protein is digested it provides the energy for growth and the constant repair of cells and tissues. Everyone at every age needs protein, but growing children especially need a large quantity every day. The human body cannot live without protein. If a person does not get enough protein in his diet, he can become very ill.

_____

_____

2. Many of us drive a car at one time or another, but not many of us know proper tire care. Here are some good hints to remember. Always use the correct air pressure in your tire. Look at your tires often. The danger warnings are clear. If there is uneven wear on the tire, it may mean the wheels are out of balance or your air pressure is not right. Too much air will wear out the middle of the tire. Too little air wears out the outer edges. Look also for cuts and breaks in the tread. Always check the valves, and screw on the valve caps tightly.

3. Parents know that each of their children has his own share of fear and anxiety. But they may not understand why he is so fearful. Parents often go so far as to say to a child who is afraid of some small thing: "Stop that nonsense. You are being silly." This is unkind. The important thing for a parent to know is what the child's greatest fear is and how to deal with it.

Write the main events of the paragraph below, in sequence.

4. An old black Dodge pulled up in front of the bank. The man inside was trembling slightly. He glanced nervously around as he pulled a mask over his face. He picked up the gun beside him and suddenly he felt very powerful. He dashed quickly into the bank and loudly ordered everyone to lie down on the floor. Pointing his gun at the tellers, he told them to put all their money in a bag. Mrs. Nelson tried to hand the money to him, but she was shaking so hard she dropped it. This was the moment Mr. Barkman was waiting for. As the robber bent down to pick up the bag, Mr. Barkman fearlessly tackled him and yelled for someone to run for the police.

After each sentence in the pair, put "C" for cause and "E" for effect, in the appropriate space.

5. The ice cream cone was left in the sun. _____

   It melted. _____

6. We closed the window. _____

   It was very cold outside. _____

7. He did not have the energy to dance at night. _____

   He worked for nine hours at the plant. _____

List the details in the paragraph that support the underlined conclusion.

8. Mrs. Thompson had a busy day. She had to take the two youngest to the doctor for a check-up in the morning. In the afternoon she had to see Sam's teacher about his bad report card. At four o'clock her husband phoned and asked if he could bring a pal home for dinner. She said OK but she felt frustrated.

_____

_____

_____

_____

_____

Read the selection and answer the questions that follow. Answer in sentences.

9.

Defensive Driving

Mr. Stuart gave some tips for safe driving and some suggestions on how to become a better driver and a defensive driver.

First lesson says to buckle your seat belts before starting your car. Also, reset mirrors and adjust the seat. Check the "feel" of steering and brakes if the car is new to you.

On the road, always give yourself an "out" - a place to steer safely in case of danger. Dim lights and drive 10 miles per hour slower at night. Give yourself room to stop any time you're driving behind another car.

Tap the brake pedal to flash stoplights when you slow down. Don't move into another lane until you can see clear space in your mirror. Yield the right-of-way. The best place for the faulty driver is out of your way so give him lots of room.

Headlights are apt to need cleaning as well as the windshield. Ask the service station attendant to wash them as well as all the windows.

a) Why should you tap your brakes? _____

_____

b) When you want to change lanes, what should you do? _____

_____

c) After getting into a car, what are four things you should do?

_____

_____

_____

d) What speed should you drive at night? _____

e) Where is the best place for a faulty driver? _____

_____

f) Why should the headlights be washed? _____

_____

g) What did Mr. Stuart mean when he said, "Always give yourself an out."?

_____

_____

(11)

Section C: For each of the passages below, state the author's purpose (entertain, persuade or inform). Briefly explain why you chose that purpose.

1. When I was a child my mother always gave us two choices at mealtime - take it or leave it. Somehow we never had any trouble making up our minds. Almost any meat we did have came in the form of meatballs. I always thought meatballs were a cut of meat off the cow like steak (which I never tasted). I suspect now most of my mother's meatballs were meatless because I don't like my wife's meatballs or anybody else's. They just don't taste like Mom's.

2. Birds make up a large and very interesting class of animals. Unlike fish, amphibians and reptiles, birds are warm-blooded animals. Their body temperatures stay about the same all the time, despite great changes in the temperature of the air around them. Birds are the only animals other than mammals that are warm-blooded.

3. Have you ever hesitated when you were about to kiss your sweetheart? Was it because you thought you had bad breath? Don't let your love life suffer because of "sour power". Freshen up your mouth and your love life with "Sparkle", the new mouthwash that won't be responsible for what happens to your love life after you begin using it.

4. Pat and Mike, the two great outdoorsmen, went hunting moose. On the first morning at the cabin while Mike was doing the breakfast dishes, Pat went out to scout around for moose tracks. A short distance from the cabin Pat came upon a big bull moose which began chasing him. Pat ran at full speed back to the cabin with the moose hot on his heels. He yelled to Mike to open the cabin door. Just before going in, Pat stepped aside and let the angry moose run right in. Pat then yelled in to Mike, "You skin that one while I go and find another."

Read the article on page 82 of Writers in Conflict. What is the author's bias? Support your interpretation with references from the article.

5.

(15)

Section D:

1. What is the difference between fact and opinion?

Read this selection and, beside each sentence, write (F) for Fact and (O) for opinion.

2.

The Just Society

The Just Society is the name of a new organization in Toronto. _____ They are working to destroy the welfare system so people can control themselves. _____ The welfare system causes much more trouble than it corrects. _____ Many people have already joined the organization. _____ There have been several programs on television about it. _____ More and more people will support it as time goes on. _____

Read the two opinions below and then, state your own opinion. Support your choice.

For the Death Penalty

3.

Every murderer should be executed. That's the only punishment that will stop a person from killing another. If people who commit murder are allowed to live, none of us is safe. Furthermore, the relatives and friends of a murdered person feel the need of revenge.

Against the Death Penalty

For centuries, convicted murderers have been hung, gassed, electrocuted, beheaded, and strangled, and yet murders continue. The threat of death does not stop a killer. Our society ought to be able to figure out a better kind of punishment and even a way of reforming criminal killers.

_____

_____

_____

_____

_____

Read the selection and briefly tell why you agree or disagree with the author.'

4. Welfare should try to restore the poor to gainful employment. Family Assistance requires welfare recipients physically qualified to take jobs or vocational training to do so, and provides stepped-up federal programs for child day-care centers, job-training and job-location assistance. Most important, it offers the poor a sliding scale of continued income support after they find work.

All this will add somewhat more than $4 million annually to federal welfare costs. But it can be argued that the present system, increasing in cost an average 10% a year, is likely to be more expensive in the long run. As it is now, more of the poor who get on welfare rolls are likely to stay on them indefinitely, passing on to the next generation the costly social disease of welfare living, whose symptoms often include nutritional starvation, educational deprivation, high rates of drug use and urban crime - to say nothing of their wasted lives.

Write your opinion on either of the 2 topics below. Support your opinion.

5.

a. People on welfare should be getting better allowances.

or

b. Nobody should have to pay for medical, dental or legal services.

(11)

Section E: Identify each of the following advertising statements as based mostly on fact (F) or mostly on opinion (O). Explain your answer.

1. She'll love a sweater coat. Cardigan-style collar with easy fitting sleeves. In a strong acrylic knit for better wear and easy washing. White, rose, apple blossom, and mauve. Sizes small, medium, large. Special price of $11.97.

_____ Why? _____

_____

2. Ever wonder why Pollutas are the top-selling large car in Canada? The reason simply stated is that when you buy a Polluta you get a lot more car. You get a lot of extras. Extras that don't cost you a nickel more.

_____ Why? _____

_____

Name 6 commonly used propoganda devices.

3.

_____ _____

_____ _____

_____ _____

Name the propoganda device (or devices) used in each of the following ads.

4. From Newfoundland to British Columbia, Canadians are wearing happy shoes made bright with Shino. Why not walk along with them?

_____

5. (With a picture of a pretty girl holding a flower, and a large bottle on a table near her.) You'll love it. Pour yourself a drink.

_____

6. (Picture of an attractive young couple holding hands.) You, too, can have an exciting romance when you use Hand Velvet, the natural cream for your hands.

_____

7. (Picture of a crowd of happy young people walking towards the camera; there is a picture of a bottle of whiskey at the side.)
Light drinkers are coming back for seconds. Join the crowd.

_____

8. (Picture of a man in a white pharmacist's coat pouring pills into a bottle.)
Who knows better than thousands of druggists what you need when you have a headache? They recommend Payer's Pillies in nine out of ten cases.

_____

9. (Picture of an easily recognized movie star.)
"I love comfort. That's why I always fly on Dogpatch United. Luxurious!"

_____

UNIT V: WRITING SENTENCES

There is no written diagnosis for this Unit. Instead, you will work through each Item and write the Item Progress Check.

Begin this Unit by getting the Learning Activities sheet for Item A. Read the Objectives, note the Learning Resources, and work your way through the assignments.

When you have completed the work outlined, re-examine the Objectives and assess your progress. If you are sure that you have mastered the objectives, you can write Form 1 of the Item Progress Check. If you do not feel prepared for the Progress Check go over the assignments again and select work from the second group of assignments before doing the Item Progress Check.

Once the Check is written, you do one of two things. If you were prepared, for the Check, you made the criterion; go on to Item B, get the Learning Activities Sheet and proceed as before. If you did not make the criterion, do additional assignments and reading. Then, write Form 2 of the Item Progress Check.

When you have read this diagnosis sheet, make a note of the studies required, on your weekly planning sheet, and return this diagnosis sheet to the files.

COMMUNICATIONS

UNIT V: WRITING SENTENCES

ITEM A: THE FORM OF A SENTENCE

OBJECTIVES

The student must be able to:

1. Recognize a sentence.
2. Recognize the subject and predicate of a simple sentence.
3. Identify the subject and predicate of a sentence in given examples and in his own written work.

LEARNING RESOURCES

Basic English Review and answer key
Basic Skills in Grammar 1 and answer key
Better and Faster Reading and answer key
English II and III
English Workshop 9 and answer key
Mastering the Sentence and answer key
Work-a-text English 1 and 2 and answer keys

LEARNING ACTIVITIES

In many of the following exercises, you cannot use an answer key as a final word. You will be writing original sentences. To check your work, ask another student, or your instructor, to go over it with you.

1. Read p. 1 of Basic English Review. Do the exercises on p. 3 and 4. Mark your work, using the key.

2. Now do p. 2 and 4 of Work-a-text English 1.

3. Now, write 10 simple sentences of your own, underlining the subject once and the predicate twice. Have another student check your work.

If you made the criterion, go on to your next Item of work. If not, choose from the following exercises, until you have mastered the objectives.

4. Select from the following:

Mastering the Sentence	p. 5-14, 21
Work-a-text English 2	p. 2
English Workshop 9	p. 29-44
Better and Faster Reading	p. 105-6
Basic Skills in Grammar 1	p. 25-31
English II	p. 4-10
English III	p. 1-4

Continue working on these exercises until you are certain you have mastered the objectives. Remember to try some sentences on your own (as in section #3 above). Then, do Item Progress Check V A, Form 2.

Communications Item Progress Check

UNIT V: WRITING SENTENCES Name: _____

ITEM A: THE FORM OF A SENTENCE Date: _____

Form 1

Criterion:	22 /25
Score:	/25

1. (6) Identify the following as sentences or non-sentences (groups of words that are not complete sentences) by writing the letter S in the blank space after a sentence and the letters NS in the blank space after a non-sentence.

a. Canada pulled out of international hockey in 1969. ____

b. Only persons who have completed grade twelve. ____

c. Victoria officials in the human resources department. ____

d. Canuck directors have a meeting scheduled for Wednesday. ____

e. The PNE roller coaster is doing great business. ____

f. After the building was almost completed. ____

2. (7) Underline the parts of each sentence below. A single line for the subject and a double line for the predicate.

a. Sports are confusing to some people.

b. The leader of the march gave the order to begin.

c. The name "Linda" means pretty, in Spanish.

d. Richard and William are going to the football game.

e. Where did you put the packages?

f. In the doorway stood her parents.

g. What should she do about this problem?

3. Write 6 sentences of your own, underlining the subject once and the predicate twice.

(12)

Communications Item Progress Check

UNIT V: WRITING SENTENCES Name: _____

ITEM A: THE FORM OF A SENTENCE Date: _____

Form 2

Criterion:	20/ 25
Score:	___/ 25

1. (6) Identify the following as sentences or non-sentences (groups of words that are not complete sentences) by writing the letter S in the blank space after a sentence and the letters NS in the blank space after a non-sentence.

a. Without your help and interest. ____

b. No decision on alternative action. ____

c. Some families are stranded as a result of the flooding. ____

d. As soon as I hear from you. ____

e. Harry is coming home for his mother's birthday. ____

f. Some people who are famous today were unknown during their own lifetime. ____

2. (7) In the following sentences, underline the subject with a single line and the predicate with a double line.

a. Most people aren't growing their own food anymore.

b. Both large and small companies are in need of good secretaries.

c. Where did you find the information on Vocational Training?

d. Decorated shops and streets are a sure sign of Christmas.

e. In the centre of the stage stood a small cluster of people.

f. The sound of the siren woke everyone up.

g. At the sound of the gun, the runners were off.

3. Write 6 sentences of your own, underlining the subject once and the predicate twice.

(12)

COMMUNICATIONS

UNIT V: WRITING SENTENCES

ITEM B: TYPES OF SENTENCES (ACCORDING TO USE)

OBJECTIVES

The student must be able to:

1. Identify different types of sentences (command, question, exclamation or statement) and their end punctuation.
2. Write complete, coherent sentences of each type.
3. Rewrite sentences to change the type (eg. write a statement as a question; etc).

LEARNING RESOURCES

Basic English Review and answer key
Basic Skills in Grammar 1 and answer key
English II and III
English Workshop 9 and answer key
Mastering the Sentence and answer key
Mastering Capitalization and Punctuation and answer key
Work-a-text English 1 and 2 and answer keys

For many of these exercises, there will not be a completely right answer. The answer key serves as a guide, not a final word. Ask other students to check your work and if you are still uncertain, check it with your instructor.

LEARNING ACTIVITIES

1. Do p. 15 and 16 of Mastering Capitalization and Punctuation. Mark your work. Then do p. 93-4 of English Workshop 9. Mark your work again.

If your work is correct to this stage, you are ready to write Item Progress Check V B, Form 1. If you need further assistance, use one or more of the references below.

Mastering the Sentence	p. 15-20
Basic English Review	p. 2, 7-8
Basic Skills in Grammar 1	p. 50-51, 108-110
Work-a-text English 1	p. 6, 8
Work-a-text English 2	p. 4
English II	p. 10-12
English III	p. 30-33

After you have written Item Progress Check V B, Form 1, and have met the criterion, go on to the next Item indicated on the Diagnosis. If you do not meet the criterion, select additional work from the above references and, after completing your work and mastering the objectives, write Item Progress Check V B, Form 2.

Communications Item Progress Check

UNIT V: WRITING SENTENCES Name: _____

ITEM B: TYPES OF SENTENCES (Use) Date: _____

Form 1

Criterion:	18 / 20
Score:	___ / 20

1. Punctuate the following sentences (end punctuation only) and, in the blank provided state whether the sentence is a statement, a question, a command or an exclamation.
(7)

a. What a beautiful day it is _____

b. Where did you get that book _____

c. We asked them about the length of the course _____

d. Dr. Sims has recently opened a new office _____

e. Get out of here _____

f. Would you please deliver this tomorrow _____

g. Did you find the roads dangerous to drive on _____

2. Change each of the following sentences, as directed, and use correct punctuation. You may add or subtract words if necessary, but don't change the basic meaning.
(13)

a. Get me a baseball and bat. ____

Question: _____

Statement: _____

b. Jim should be going home soon.

Command: _____

Question: _____

c. That move cost him the chess match.

Exclamation: _____

Question: _____

d. Did you go into the cave?

Exclamation: _____

Statement: _____

Command: _____

e. Was there any danger in the job?

Statement: _____

Exclamation: _____

f. Will you come with us?

Command: _____

Statement: _____

Communications Item Progress Check

UNIT V: WRITING SENTENCES Name: _____

ITEM B: TYPES OF SENTENCES Date: _____

Form 2

Criterion:	16/20
Score:	___/20

1. Punctuate the following sentences (end punctuation required) and, in the blank provided, state whether the sentence is a statement, a question, a command or an exclamation.
(7)

a. Phew, that was a close call _____

b. Why don't you use the shears _____

c. You could use the other saw for that work _____

d. Bring me the completed assignment _____

e. Quick, shut off the power _____

f. Why didn't you check the ladder before using it _____

g. Hurray, we won _____

2. Change each of the following sentences to another type of sentence, as directed. You may add or subtract words, but do not
(13) change the basic meaning.

a. I'm not going to use that net; it's worn through.

Question: _____

Command: _____

b. Was that a dangerous place to camp?

Exclamation: _____

Statement: _____

c. We went to see an exciting display of fireworks.

Question: _____

Exclamation: _____

d. Wow, I never saw such a tricky feat!

Statement: _____

Question: _____

e. Would you please leave at once?

Command: _____

f. Everybody left after having coffee and snacks.

Question: _____

Command : _____

g. Where did he learn to do that dive?

Statement: _____

Exclamation: _____

COMMUNICATIONS

UNIT V: WRITING SENTENCES

ITEM C: TYPES OF SENTENCES (ACCORDING TO STRUCTURE)

OBJECTIVES

The student must be able to:

1. Given examples, write simple, compound and complex sentences.
2. Combine simple sentences to make one sentence.
3. Rewrite a compound or complex sentence as separate sentences.

LEARNING RESOURCES

Basic English Review and answer key
Basic Skills in Grammar 1 and 2 and answer keys
Better and Faster Reading and answer key
English III
Mastering the Sentence and answer key
Work-a-text English 2 and answer key

LEARNING ACTIVITIES

1. Read p. 46-48 of Basic Skills in Grammar 1. Write a sample sentence of each type. Before continuing, have your instructor check your sentences to make sure that they are correct. Do the exercise on p. 49 of Basic Skills in Grammar 1. Rewrite the compound and complex sentences, from the exercise, making them into two simple sentences.

2. To practice making simple sentences into compound or complex sentences, do the exercise on p. 80 of Basic Skills in Grammar 2. Have your instructor or another student check your work with you.

Now, do Item Progress Check V C, Form 1. If you make the criterion, go on to the next Item you need to work on. If not, select work from the following references.

3. Select work from the following:

Basic English Review	p. 157-8, 161-2
Mastering the Sentence	p. 25-30, 37-39, 41-49
Basic Skills in Grammar 2	p. 73-81
English III	p. 22-26
Better and Faster Reading	p. 106-108
Work-a-text English 2	p. 104-106, 116, 118, 128

4. Practice writing your own sentences, do at least 10 of each type. Also, practice rewriting compound and complex sentences as simple sentences and simple sentences as either compound or complex sentences.

Now, do Item Progress Check V C, Form 2. Remember to staple your work for this Item to your Item Progress Check after you have written it.

Communications Item Progress Check

UNIT V: WRITING SENTENCES Name: _____

ITEM C: TYPES OF SENTENCES (structure) Date: _____

Form 1

Criterion:	14 / 16
Score:	__ / 16

1. (6) Using each given sentence as a model, write a similar sentence in your own words on the lines provided.

a. (Simple) There was the sickening sound of splintering wood.

_____

_____

_____

b. (Simple) After the game, Mr. Grant had a party for the team at his house.

_____

_____

_____

c. (Compound) Jet fighter Number 313 taxied onto the end of the runway, and the controller cleared it for take-off.

_____

_____

_____

d. (Compound) Some stories are meant to be merely entertaining but many stories are meant not only to entertain but to inform.

_____

_____

_____

e. (Complex) In Port Jervis, the Fire Chief was in a fire truck in the flooded part of town, when he heard the broadcast.

_____

_____

_____

1. f. (Complex) Since in fiction the theme is usually implied only, this type of story is often the hardest to interpret.

_____

_____

_____

2. (7) Rewrite these groups of simple sentences as either one compound or complex sentence.

a. Ronald arrived in Canada for the first time. He was then taken to Vancouver Island.

_____

_____

_____

b. The picnic lunch was all packed and ready. Sarah went to call the children.

_____

_____

_____

c. I remembered noticing his coat. He had patched it several times.

_____

_____

_____

d. We arrived by train 2 days later. Our cousins were waiting for us at the station.

_____

_____

_____

2. e. The officers went down to look at the grain. It was being stored in the middle of the ship.

f. Marian threw out her writings. She felt dissatisfied with them.

g. You want to take a holiday. You must first decide where to go. You next decide what to take along.

3. (5) Rewrite these compound or complex sentences as two or more separate sentences.

a. Oceanography students attend classes underwater and take notes using yellow crayons on zinc slates.

b. Lemmings are particularly common in the mountainous regions where the juniper trees grow.

c. Birds which destroy harmful insects should be protected by our conservation laws.

3. d. Pets can be a lot of trouble, but they are also a lot of fun.

_____

_____

_____

e. The committee recommended that the decision should be delayed a few months.

_____

_____

_____

Communications Item Progress Check

UNIT V: WRITING SENTENCES

Name: _____

ITEM C: TYPES OF SENTENCES (structure)

Date: _____

Form 2

Criterion:	14/ 16
Score:	___/ 16

1. (6) Using each given sentence as a model write a similar sentence in your own words on the lines provided.

a. (Simple) Miami Beach goes on for miles with its monotonous lines of palm trees.

_____

_____

_____

b. (Simple) Each afternoon a rather seedy saxophone player stands on the sidewalk playing "Danny Boy".

_____

_____

_____

c. (Compound) The hawks remain there for only a little while, and then they fly out to the river.

_____

_____

_____

d. (Compound) High school students take courses in science and mathematics, but only a small percentage of them carry on their studies in college.

_____

_____

_____

e. (Complex) At night when street traffic dwindles in New York, some neighbourhoods begin to crawl with cats.

_____

_____

_____

1. f. (Complex) When the Soviet Lunik raced past the moon and free of the earth, it marked a turning point in the multibillion-year history of the solar system.

_____

_____

_____

2. Write a compound sentence. _____

(1) _____

3. Write a complex sentence. _____

(1) _____

4. Write a simple sentence. _____

(1) _____

5. Rewrite these pairs of sentences as one sentence, either a compound or
(5) complex sentence.

a. Mary's family moved to another town. Jane's family still lives here.

_____

_____

_____

b. Eskimos depend on the sea for their food. They live near the sea.

_____

_____

_____

c. The walrus has to break through the ice to breathe. He does not keep an open breathing hole.

_____

_____

_____

d. I enjoyed the play very much. The play was put on by the class.

e. We all memorized that poem. You may recite it for the class.

6. Rewrite the following compound or complex sentences as 2 separate sentences.
(5)

a. The boy who brought the groceries lives next door.

b. The person who borrowed the locker key has not returned it.

c. Difficult assignments were given to her, but by determination she accomplished each task.

d. She had entered three stories in the contest; each one of her stories won a prize.

_____

_____

_____

e. He finished school in Vancouver and later took a welder's training course.

_____

_____

_____

COMMUNICATIONS

UNIT V: WRITING SENTENCES

ITEM D: VARIETY

OBJECTIVES

The student must be able to:

1. Select and complete sentence fragments.
2. Rewrite a run-on sentence by breaking it up into two or more sentences to vary structure.
3. Rewrite given sentences, varying the beginning of the sentence.
4. Rewrite given sentences by combining sentence elements, for variety.
5. Rewrite given sentences to clarify meaning and avoid confusion.

LEARNING RESOURCES

Better and Faster Reading and answer key
Basic English Review and answer key
Basic Skills in Grammar 1 and 2 and answer key
English II and III
English Workshop 9 and answer key
Mastering The Sentence and answer key
Work-a-text English and answer key

LEARNING ACTIVITIES

You have already looked at different types of sentences, both according to use and to structure. You've also looked at how to change one type around to make it a different type. In this item, you will look at other ways of varying your sentences. When you are writing, keep these points in mind. After all "Variety is the Spice of life."

1. Start your work in English Workshop 9. Read p. 41 and do the exercises on p. 41-42.

2. Use English Workshop 9 for this part, too. Read page 95 and work through exercises 1 to 4 on pages 95 and 96.

3. Use English III, read page 117. Then answer the questions on page 118.

4. Use Work-A-Text English I. Read page 10 and answer the questions.

5. Use English II. Read pages 91 to 96 and do all the exercises. Then do questions 1 to 7 on page 99 and 1 to 8 at the top of page 100.

You are now ready for the Item Progress Check. Review the objectives and check with your instructor to do Form 1.

If you did not make the criterion, look over the objectives to see which ones you missed. Then, select from the following exercises, those which are appropriate to your needs.

5.	Objective 1 -	Basic English Review	p. 1, 3-4
		Basic Skills in Grammar	p. 69, 71-2
		English Workshop 9	p. 85-92
		Mastering the Sentence	p. 1-4, 51-54
	Objective 2 -	Mastering the Sentence	p. 42, 55, 56, 58
		Basic Skills in Grammar 2	p. 70, 71-73
		Work-a-text English 1	p. 12
	Objective 3 -	Basic Skills in Grammar 2	p. 75, 77-78, 85 (exercise B)
		Mastering the Sentence	p. 58

Objective 4 -	Basic Skills in Grammar 2	p. 78-81, 86 (exercise C)
	Better and Faster Reading	p. 105-7, 108 165
Objective 5 -	Basic Skills in Grammar 2	p. 81-83, 86 (exercise D)
	English III	p. 114-118

General Review Exercises

Basic Skills in Grammar 2	-	p. 84-86
Work-a-text English 1	-	p. 14

After doing the necessary work, go on to Item Progress Check V D, Form 2.

Communications Item Progress Check

UNIT V: WRITING SENTENCES Name: _____

ITEM D: VARIETY IN SENTENCES Date: _____

Form 1

Criterion:	18 /20
Score:	___/20

1. Label the following as S for sentence or F for fragment. Use the lines below to write sentences, using the group of words (9) you labeled as fragments.

a. When I get home at night _____

b. Give him the answers to the test ____

c. The crowd cheered _____

d. New uniforms for the team _____

e. Under the back porch _____

f. That's your problem _____

_____

_____

_____

_____

2. Rewrite this paragraph, using better sentences and more variety. Add some of your own words to improve them.

(4)

Jan started B.T.S.D. after being out of school for 5 years and found out she could do the work easily and enjoy it, but she also decided that she should think again about her future; she'd planned on being a nurse but decided that medical secretary was a more realistic goal. After she finished her course, she found a part-time job and worked for five months, at which time, she went into another course to begin her secretarial training.

3. Rewrite these sentences, changing the order or structure, so as to clarify meaning or provide variety.

(7) Add some of your own words to improve them.

a. Harvey told the police everything yesterday afternoon.

b. John is going to the performance and I am going with him.

c. I enjoy cooking and serving gourmet meals.

d. I am going to learn to fly in the near future.

e. That boy was riding a bicycle down the road with blue fenders.

f. He went to school when his part-time job was finished.

g. I got up this morning and had a severe backache.

Communications Item Progress Check

UNIT V: WRITING SENTENCES Name: _____

ITEM D: VARIETY Date: _____

Form 2

Criterion:	16/ 20
Score:	___/ 20

1. Label each of the following groups of words as S for sentence or F for fragment.

(8)

a. The man who lives next door _____

b. Until the reign of Elizabeth I _____

c. Where is the butter _____

d. Standing on a hill top _____

e. Come into this room _____

Rewrite the groups of words you labelled as fragments to make complete sentences of them.

_____

_____

_____

_____

2. Rewrite this paragraph, using better sentences and more variety.

(4)

Looking for a job is not easy unless you know what kind of work you're looking for and keep that in mind as you look through advertisements in the newspaper and apply to companies in the area that can use your services. You shouldn't bother to apply to companies that don't hire people who do the kind of job you're looking for because they won't hire you and you'll get discouraged even though the reason that they won't hire you is that you're looking in the wrong place and you should first look in the right place.

3. Rewrite these sentences to improve structure and add variety. You may add or subtract words if necessary, but be careful
(8) not to change the intended meaning.

a. Don't panic when an unusual noise frightens you.

b. The leader of the orchestra rose to his feet and rapped for attention with his baton.

c. We enjoyed fishing for trout and to paddle our canoe on the lake.

d. The police found the thief hiding in a blind alley.

e. He's very clever at solving mathematical problems and working out formulas in his head.

f. He was, of course, the best player in the ball team wearing the number 17.

g. Leaping over the hurdle, it fell on my legs.

h. He was one of the best students. He completed his Math. work in less than two months.

UNIT VI: WRITING PARAGRAPHS

There is no written diagnosis for this Unit. You will instead write a test for each Item.

Begin this Unit by procuring the Learning Activities sheet for Item A. Read the Objectives, note the Learning Resources, and work your way through the first group of assignments.

When these have been completed, you will have to assess your own capabilities, and decide whether or not you are ready to write Item Progress Check A, form 1.

If you are properly prepared, you will complete the Progress Check successfully, and move on to Item B.

If however, you do not feel ready to try the Item Check after doing the first group of assignments, move directly on to the additional reading and exercises. When all of these have been completed, you then write Item Progress Check A, form 1. If you require further guidance or work, ask your instructor.

If you write form 1 of the Progress Check, but do not make the criterion, do the additional assignments and reading. If you feel you require further work and guidance, ask your instructor. Then write Item Progress Check A, form 2.

When you have read this diagnosis, make a note of the studies required on your weekly planning sheet. Then return this diagnosis to the files.

COMMUNICATIONS

UNIT VI: WRITING PARAGRAPHS
ITEM A: STRUCTURE

OBJECTIVES

The student must be able to...

1. Define a paragraph.
2. Define a topic sentence.
3. Identify a topic sentence in a paragraph.
4. Write a topic sentence for a paragraph
5. Write a paragraph, given the topic sentence.

LEARNING RESOURCES

Work-a-Text in English 1 , with answer key

English Workshop 9, with answer key

Basic English Review, with answer key

LEARNING ACTIVITIES

In dialogue each speech is a paragraph. Ordinarily however, a paragraph is a group of sentences developing one topic.

Paragraphs vary widely in length from the short ones to an occasional long one of 250 or 300 words. A good length for ordinary writing is 100 to 150 words. In newspaper articles and business letters shorter paragraphs are used. The average length of paragraphs in business letters is about 60 words; in newspaper articles, about 75 words. Don't make the mistake of writing, in a composition or a test, a paragraph pages long, or of starting a new paragraph for each sentence. We shall study when to stop one paragraph and begin a new.

1. Read page 34 in Work-a-Text English 1, noting carefully the four features of a paragraph. Do the exercises and check your answers.

2. Read page 36 in the same book, and do the exercises on writing topic sentences. Correct your answers.

3. Now read page 38 carefully. Outlined here are several ways in which a paragraph can be built. Make notes on these. Do the three exercises in your notebooks. Check your work.

Now review the Objectives for this Item. If you are sure you can meet these, write the Item Progress Check for Unit VI, Item A (form 1).

If you feel you need more work, or if you failed to achieve the criterion in the form 1 Progress Check, study the following:

TOPIC SENTENCES: When we travel, we first buy a ticket, on which our starting point and destination are shown. When we write or speak a paragraph, it is wise to start with a topic sentence making clear exactly what we are going to talk about. A topic sentence is a brief statement of the subject of the paragraph. At the beginning of the paragraph it furnishes a destination or goal for the writer or speaker and guides him in travelling towards his goal.

A good topic sentence, like a good guide, gives accurate and complete information. Some topic sentences are about as vague as the directions, "Go straight ahead for about half a mile, then turn right, then turn left, then turn left again..."

One can develop a narrow topic sentence in a paragraph, but usually needs two or more paragraphs to discuss a broad topic. "A true sportsman has many admirable qualities" and "A true sportsman is honest, courteous, self-controlled, courageous, loyal and enthusiastic" are broad topic sentences. "A true sportsman must be a good loser" and "A true sportsman will never cheat to win" are narrower topic sentences.

After driving home his idea in a paragraph, a writer may clinch it in the last sentence by restating tersely and vigerously the point of the paragraph.

4. Now read and do the exercises in:

English Workshop, page 219 to 221 (top), and page 222 to 224(centre)

Basic EnglishReview, page 159.

Now review the Objectives, and try form 2 of the Progress Check for this Item.

Communications Item Progress Check

UNIT VI: WRITING PARAGRAPHS Name: _____

ITEM A: STRUCTURE Date: _____

Form 1

Criterion:	12/ 14
Score:	___/ 14

Answer each question as instructed.

(1) 1. What is a paragraph? _____

_____

(1) 2. What is the topic sentence of a paragraph? _____

_____

(5) 3. Underline the best topic sentence, from each set of sentences given below.

a. The tent should always be located on high ground.
b. Camp fires should be put out properly before leaving.
c. Camping is good recreation for every member of the family.

a. Last Saturday Jack and I fished all day.
b. Jack had great luck and I didn't.
c. I didn't use the right bait.

a. Dogs often show great intelligence.
b. A dog can be trained to retrieve birds.
c. Rover is an example of a seeing-eye dog.

a. Most disasters occur during take-off or landing.
b. In the aviation industry we can not go on having big disasters.
c. In March, 1974, over 300 people lost their lives in a recent disaster in Paris, France.

3. a. A stamp collector also learns about geography and history.
   b. Old stamps which are in good condition are highly prized.
   c. Stamp collecting is a good hobby.

(2) 4. Write a good topic sentence for a paragraph which:

(a) describes the wonderful day which you had with your friends at the beach.

_____
_____
_____

(b) tells how to begin obedience training for a dog.

_____
_____

(5) 5. Write a short paragraph using this topic sentence.

Many people think that possessions make them important.

_____
_____
_____
_____
_____
_____
_____
_____

Communications Item Progress Check

UNIT VI: WRITING PARAGRAPHS Name: _____

ITEM A: STRUCTURE Date: _____

Form 2

Criterion:	11/ 14
Score:	___/ 14

Answer each question as instructed.

(1) 1. What is a paragraph? _____

_____

(1) 2. What is the topic sentence of a paragraph? _____

_____

(5) 3. Underline the best topic sentence from each of the sentences given below.

a. My best pal is one of these half-wild creatures.

b. The character of the police dog is complex.

c. From constant companionship I have discovered that he really has a dual personality.

a. There is the old oak chest that stands in my room.

b. Many of the possessions in our family help me to know more about my ancestors.

c. On our mantel there still ticks away a large clock that must be much older than my father.

a. It is hard to be stern with a baby yet it so often seems necessary.

b. After all, a baby is such a delicate bit of humanity.

c. I am angry because I have been fooled into feeling sorry for him.

a. Unlike the orange, no bitter peel has to be stripped from the exterior.

b. I prefer an apple to any other fruit.

c. One can eat it with confidence, knowing that one's face will not be smeared uncomfortably.

3. a. Mines have been opened for which there is little need.
   b. Factories waste valuable by-products because of inadequate machinery.
   c. It has been estimated that more coal has been wasted than mined.

(2) 4. Write a good topic sentence for a paragraph which:

   a. describes how you would spend fifty dollars.

   _____

   _____

   b. describes the effects of an ice storm in your community.

   _____

   _____

(5) 5. Write <u>one</u> short paragraph using <u>one</u> of the following topic sentences.

   a. He's the sort of fellow that makes a worthwhile friend.
   or b. There are mind poisons just as there are body poisons.
   or c. Travel is becoming swifter every day.

   _____

   _____

   _____

   _____

   _____

   _____

   _____

   _____

COMMUNICATIONS

UNIT VI: WRITING PARAGRAPHS
ITEM B: DEVELOPMENT

OBJECTIVES

The student will be able to...

1. Develop a paragraph using
   (a) details
   (b) examples
   (c) comparisons
2. Write a paragraph using variety in sentences.
3. Link sentences together to form a cohesive paragraph.
4. Write two or more paragraphs showing continuation between them through transition and connective words.

LEARNING RESOURCES

English Workshop 9, with answer key

Work-a-Text in English 1, with answer key

Better and Faster Reading, with answer key

LEARNING ACTIVITIES

The two principles of paragraph structure are unity and coherence. To be correct and clear, pleasing and forceful, a paragraph must adhere to these basic principles.

UNITY: Unity means oneness. A paragraph has unity of thought if it sticks to one subject. While planning the paragraph, ask yourself frequently, "Is this on the subject?" If the answer is "NO," cross out the detail or example. Likewise when you revise your paragraph, ask "Have I held to my subject throughout?" If the completed paragraph is unified, you can sum it up in a sentence. If you do not forget your topic sentence and key word you are not likely to lose the unity of your paragraph.

COHERENCE: Coherence, literally "hanging together", includes two things: (1) the proper arrangement of the ideas and (2) bridging the gaps between sentences with connectives that show the exact relationship of part to part.

(1) Arrangement. In building a paragraph or a house, before beginning the actual construction, one needs materials, and also a plan in mind or on paper. When planning, arrange your ideas or points in a natural, sensible order. Sometimes--when you are writing about and experiment or happening, for example--the time order is best; when you are describing a scene or a picture, the space order is best. On other occasions you will find it wise to lead your reader from what he knows to facts you wish to make clear to him. Ideas and examples are often arranged in the order of importance, with the best last.

The different sentences that compose a paragraph should follow one another in natural and logical order. If they do not, the attention of the reader is distracted, and he finds is difficult, if not impossible, to keep his attention on the topic.

(2) Connectives. It is not enough that the sentences of a paragraph follow one another in proper order; the connection of each with the preceding idea must be made clear and unmistakable.

A steel, concrete, or wooden bridge joins two banks of a river; a word bridge joins two sentences or paragraphs and keeps the reader's thought on the path the writer or speaker wishes him to take. A teacher once said that "The art of writing is the art of using hooks and eyes."

Useful bridges, or useful hooks and eyes are *this, that, these, those, such,* and *same,* personal pronouns, repeated nouns, synonyms, adverbs, conjunctions, and connective phrases. Some of these expressions carry the idea forward; most of them look backward.

The repeated word is called an "echo word".

To add ideas use: *and, moreover, further, furthermore, also, likewise, similarly, too, in like manner, again, in the same way, besides.* These words are plus signs.

To introduce statements opposing, negative, or limiting in some way the preceding statements use: *but, nevertheless, otherwise, on the other hand, conversely, on the contrary, however, yet, still.* These words are minus signs.

To show time relation use: *then, now, somewhat later, presently thereapon, thereafter, eventually, at the same time, meanwhile.*

To indicate order use: *next, in the second place, to begin with, finally, secondly, in conclusion, first.*

To show space relation use: *to the right, in the distance, straight ahe ahead, at the left.*

To introduce illustrations use: *for instance, for example.*

To indicate a consequence or conclusion use: *hence, consequently, thus, so, for this reason, accordingly, therefore, as a result, it follows that.*

To indicate a repetition of the idea use: *briefly, that is to say, in fact, indeed, in other words.*

To compare use: *similarly, likewise*

When the thoughts are very closely related, no connective is required.

METHODS OF PARAGRAPH DEVELOPMENT: Paragraph building is the development of the topic (usually the topic sentence) in some logical and natural manner.

After writing a topic sentence ask yourself the questions: "How?" "Why?" "What?" "What of it?" "What is it like or unlike?" "What example will make my point clear?" "How do I know?" If you know enough about the subject to write a paragraph, these questions will call fourth particulars, details, examples, illustrations, instances, comparisons, contrasts, reasons, and results which are like the boards, bricks, and beams of a house, the material out of which a paragraph is built.

The way to develop a paragraph depends, naturally, on what you have to say. You may picture the details of how the mile relay team won a close race, give examples of the spectators' behaviour at the meet, compare the differences in strategy between running the mile relay and the half-mile relay.

SUPPLYING DETAILS: One way of developing a paragraph is by adding details. Paragraphs thrive on details.

Specific details which often answer the questions "What?" and "How?" may be used to develop or explain a general statement made in the topic sentence. Details make more vivid a word picture of a person, place, thing, or event. If you make a general statement, that Helen is well dressed you may make the picture clearer by describing her clothing, the colour scheme, the accessories, and the neatness and appropriateness of her outfit. It's the specific facts that put the paragraph across.

SUPPLYING EXAMPLES: To make an explanation clear or to prove a point, give examples or illustrations. You may discuss fully one example or refer briefly to several. If you say "The twentieth century has seen great progress in science," you may prove your point by discussing in detail one discovery, such as television, or by briefly mentioning several--television, space technology, and others.

USING COMPARISON: If you were describing a tiger to a small child who had never seen one, you would probably compare it to a cat. If you were describing how a child was educated in a Communist country, you would contrast his education with a child's schooling in a Democracy. In describing to boys and girls the appearance of the human brain, one doctor compared it to a cauliflower. The doctor was trying to explain the appearance of something unfamiliar by showing that it is like something familiar to his audience. Comparisons (showing how two things are alike or different) and contrasts (showing how two things differ) help to clarify our ideas. All the points on one side may be balanced against all the points on the other side, or the two objects may be compared a point at a time.

1. Read pages 225 to 227 in English Workshop. The do exercises A and B which follow on pages 227 to 229. Correct your work.

2. Read pages 44 and 46 in Work-a-text English 1. Do the exercises outlined on these pages. Correct your work.

Your Item Progress Check requires you to write several paragraphs showing continuity. In addition, sentence variety and a specific method of development is required. If you feel confident that you can do this, and do it well, go ahead and write form 1 of the Item Progress Check.

However, if you feel that you would like some more practice, re-read (study) carefully the notes at the beginning of the Learning Activities. Then do the following:

3. Better and Faster Reading, Read and do the exercises on...
   pages 113 to 116
   pages 124 to 126
   pages 133 to 136
   pages 136 to 141

When you have completed the above assignments and corrected the exercises check the Objectives, and then write form 1 of the Item Progress Check. If you continue to have problems, check with your instructor.

If however, you attempted and failed the Item Check following assignment 2, complete assignment 3, and then write Item Progress Check VI B, form 2.

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Communications Item Progress Check

UNIT VI: WRITING PARAGRAPHS Name: _____

ITEM B: DEVELOPMENT Date: _____

Form 1

Criterion:	23/ 27
Score:	___/ 27

Write the following paragraphs as instructed. In these assignments, your writing will be judged on unity and coherence as well as variety in sentences. Write each on a separate piece of paper.

(6) 1. Write a paragraph using details, to describe . . .
   (a) a good friend.
   or
   (b) a view from a window.

(6) 2. Write a paragraph using examples, to show that . . .
   (a) cars serve many purposes.
   or
   (b) dogs make good pets.

(12) 3. Write two or three short paragraphs, using comparisons, on one of these topics.
   (a) Small cars are better than big cars (or vice versa).
   (b) Summer is better than winter (or use any other seasons).

(3) 4. Link the following sentences together to form a smooth, cohesive paragraph.

We started by looking at classified ads in the paper advertising apartments for rent. We needed two bedrooms. We wanted to pay less than $150. We looked at several. Most were unsuitable. We were getting discouraged. We finally found one. We were pleased.

_____

_____

_____

_____

_____

_____

When you have completed these assignments, staple them to this sheet of paper and hand it in to your instructor for marking.

Communications Item Progress Check

ITEM VI: WRITING PARAGRAPHS
ITEM B: DEVELOPMENT
Form 2

Name:_____

Date:_____

Criterion 18/24
Score: ___/24

Reread the paragraphs you wrote for the form 1 Item Progress Check. Carefully check the errors noted and the suggestions made by your instructor.

Re-write all three paragraphs, each on a separate sheet of paper. Correct all the errors and improve the writing wherever you can.

Staple these re-written paragraphs to this sheet, and hand them in for checking by the instructor.

UNIT VI: WRITING PARAGRAPHS
ITEM C: APPLIED PARAGRAPH WRITING

OBJECTIVES

The student must be able to:

1. Write a paragraph giving information on an occupation.
2. Write a paragraph expressing an opinion with supporting argument on a specific current topic.
3. Write a report of several paragraphs comparing two different occupations.

LEARNING RESOURCES

English III, Wachner

Cambridge Work-aText in English 2, and answer book

Occupational Information Monographs

LEARNING ACTIVITIES

As you can see by the Objectives for this Item, you are now expected to be able to apply the writing skills which you studied and learned while doing Items A and B.

1. Reread and consider the Objectives for Items A and B for this Unit. Be sure you know what each one implies.
2. Read pages 100 to 107 in English III but do not do any of the exercises. This reading is to serve as a review of paragraph writing.
3. Read page 31 of Work-a-Text 2, and again do not do the exercise, but note carefully the directions and suggestions on paragraph writing.

4. On a separate sheet of paper, write a paragraph outlining information on an occupation which interests you.

In preparation for the above assignment, read a number of the descriptions of occupations from the Occupational Information Monographs. Select one of these and write one paragraph outlining the most important ideas. Check your work.

5. On a separate sheet of paper, write a paragraph expressing an opinion on a specific current topic.

Consider an item which is presently in the news, and on which you have a definite opinion. State your opinion and carefully lay out arguments by which you can support your opinion. Before deciding on the topic, discuss it with your instructor. He may want you to prepare your topic for a presentation in Oral Communications, as well as write a paragraph on it. Develop and conclude your paragraph using the techniques which you have recently learned.

6. On a separate sheet of paper, write a report of several paragraphs comparing two different occupations.

Look at a number of titles in the Occupational Information Monograph series and select two occupations (different from that which your wrote on in assignment 4) which interest you. Write a short composition of several paragraphs comparing and contrasting the two. Be sure your transition from one paragraph to the next is smooth and definite. Check your work.

This completes Item C. Be sure all of the above assignments are complete before you try form 1 of the Item Progress Check.

If you are required to do form 2 of the Item Progress Check, your instructor will give you the necessary instructions.

Communications Item Progress Check

UNIT VI: WRITING PARAGRAPHS
ITEM C: APPLIED PARAGRAPH WRITING
Form 1

Name: _____

Date: _____

Criterion	20/ 24
Score	___/ 24

Collect the paragraphs which you wrote for assignments 4, 5, and 6 of this Item. Staple them to this sheet of paper and hand them in for checking by the instructor.

Before handing in the assignments however, be sure to check your writing. It must show that you have mastered the Objectives in Items A, B, and C. You may be better off to re-write some of it now, rather than to do form 2 of the Item Progress Check. Check spelling, punctuation, and word usage. Check your methods of development; does your writing show unity and coherence?

When you are satisfied with the quality of your work, hand it in to your instructor.

Communications Item Progress Check

UNIT VI: WRITING PARAGRAPHS
ITEM C: APPLIED PARAGRAPH WRITING
Form 2

Name:_____

Date:_____

Criterion	20/ 24
Score	___/ 24

Reread the paragraphs you wrote for the form 1 Item Progress Check. Carefully check the errors noted and the suggestions made by your instructor.

Re-write all four assignments, each on a separate piece of paper Correct all errors and improve the writing wherever you can.

Staple these re-written paragraphs to this sheet, and hand them in for checking by the instructor.

COMMUNICATIONS

UNIT VI: WRITING PARAGRAPHS
ITEM D: PROOFREADING

OBJECTIVES

The student must be able to:

1. List items or errors to look for while proofreading written work.
2. Proofread written work, correcting all errors.

LEARNING RESOURCES

Work-a-Text in English 2

LEARNING ACTIVITIES

Proofreading is the last thing which you must do when you write a paragraph, report or letter. All errors in punctuation, any mistakes in capitalization, every faulty use of words should be corrected before the reader receives your writing.

A checklist of commonly broken rules of usage and punctuation follows this page.

1. Read this checklist. Copy out those rules which you feel you are most likely to break. Add to your list any habitual mistakes which you made while working on Communications Units I, II, and III. Check back in your work to see what they were.

2. Proofread the following paragraphs. Rewrite them correctly in your notebook.

Its easy to leave school. You now people who have done it they take a job and make some money and perhaps buy a used car and seem to become independent

Its easy to escape boring subjects its easy to leaf behind all there problems --homework examinations and lack of spending money

But just a minute before you throw away your books stop and ask yourself-- where will my first job lead How long will it last is it a dead end job what happens if I loose it where do i go from their will i ever get that job ive always dreamed about How many jobs can I get with my present education

Using Capital Letters

Use a **capital letter** for the word **I** and for each initial of a name.

Use a **capital letter** to begin:

1. The first word of a sentence.
2. Each word in the name of a person or pet.
3. The name of a relative (**Mother, Aunt, Uncle**) when the name is used as or with a name.
4. A title or abbreviation of a title used with a name.
5. Each word in the name of a place, a building or memorial, a street or highway, a club or organization, a day, a month, or a holiday.
6. The first word and every important word in the title of a story, a book, a magazine, a play, a poem, or a song.
7. The first word and every important word in the greeting, and the first word of the closing in a letter.
8. The name of a country or a race of people, and a word made from the name of a country or a race of people.
9. The first word of a direct quotation.

Using Punctuation Marks

Use a **period** after a declarative or an imperative sentence, an initial, or an abbreviation.

Use a **question mark** after an interrogative sentence.

Use an **exclamation mark** after an exclamatory sentence and after an interjection.

Use a **comma:**

1. Between the name of a city and its state or country (and after the state or country if the city and its state or country are used in a sentence), and to separate a city zone number and the state.
2. Between a day of the month and the year (and after the year if the month, day, and year are used in a sentence).
3. After the closing of a letter.
4. After the greeting of a friendly letter.
5. In a series, after each word or group of words except the last.
6. To separate the name of a person spoken to from the rest of the sentence.
7. To set off the words **yes** and **no** at the beginning of a sentence.
8. To set off explanatory words from the words of a direct quotation.
9. After the part of a sentence that begins with a conjunction if that part comes at the beginning of the sentence, and before some conjunctions if that part comes at the end of the sentence.

Use a **colon** after the greeting of a business letter.

Use an **apostrophe:**

1. In a contraction where letters are left out.
2. In a noun to show possession.

Underline the title of a book or magazine when it is used in a sentence.

Use **quotation marks:**

1. To enclose a direct quotation or each part of a divided quotation.
2. To enclose the title of a song, a poem, a story, or a short play if the title is used in a sentence.

Using the Right Word

1. Use **came, gave, ate, drank, sang, rang, began, took, did, went, ran, saw, threw, knew, grew, wore, tore, chose, broke, spoke, wrote, sank, swam, rode, stole, froze, flew, blew,** and **drew** alone.
2. Use **come, given, eaten, drunk, sung, rung, begun, taken, done, gone, run, seen, thrown, known, grown, worn, torn, chosen, broken, spoken, written, sunk, swum, ridden, stolen, frozen, flown, blown,** and **drawn** with a helping word.
3. With the word **I** use **am, have, do, don't.**
4. With singular nouns and with **he, she,** or **it,** use **is, isn't, was, wasn't, has, does, doesn't.**
5. With plural nouns and with **you,** use **are, aren't, were, weren't, do, don't, have.**
6. Use **teach** or **taught** to mean to show someone how to do something or to help him become familiar with, and **learn** or **learned** to mean to gain knowledge, understanding, or skill.
7. Use **there is** or **there was** if the subject is singular; use **there are** or **there were** if the subject is plural.
8. **Bring** means to carry from a far place to a nearer place. **Take** means to carry from a nearby place to a place farther away.
9. Use **this, that** (with singular nouns), and **these, those** (with plural nouns) as adjectives to point out, and **them** as a pronoun to stand for the names of persons or things. Never use **them** as an adjective.
10. Do not use unnecessary words such as **here** after **this** and **these, there** after **that** and **those,** or **they, he, she,** or **it** after a noun.
11. Use **sit** to mean to rest and **set** to mean to place.
12. Use **may** in asking or giving permission and **can** in expressing ability to do something.
13. Use **let** to mean to permit or allow, and **leave** to mean to go away from or to go without taking.
14. Use **an** before a word beginning with a vowel sound, and **a** before a word beginning with a consonant sound.
15. Use only one negative to express one idea.
16. Use **lie** to mean to rest or to recline, and **lay** to mean to place or to put an object somewhere.
17. Use **rise** to mean to go up or to get up, and **raise** to mean to lift up or to grow something.

Using Pronouns

1. Use **I, he, she, it, you, we,** and **they** as subject pronouns.
2. Use **me, him, her, it, you, us,** and **them** as object pronouns.
3. Use **your, its, whose,** and **theirs,** as possessive pronouns. Never use an apostrophe in a possessive pronoun.

Below is the correct copy of the proofreading exercise in assignment 2. If you made any errors, do assignment 3 (below); if not, do the Item Progress Check. Or if you failed to meet the criterion on form 1 of the Check, go on to do assignment 3.

It's easy to leave school. You know people who have done it. They take a job, make some money, perhaps buy a used car, and seem to become independent.

It's easy to escape boring subjects. It's easy to leave behind all the problems--homework, examinations, and lack of spending money.

But wait a minute! Before you throw away your books, stop and ask yourself--"Where will my first job lead? How long will it last? Is it a dead-end job? What happens if I lose it? Where will I go from there? Will I ever get that job I've always dreamed about? How many jobs can I get with my present education?"

3. Read and do the exercises on pages 80, 82, 84, 86, and 88 on Work-a-Text 2. Work slowly and carefully. Correct your work.

When you have completed the above, do the Item Progress Check for Unit VI, Item D.

Communications Item Progress Check

UNIT VI: WRITING PARAGRAPHS
ITEM D: PROOFREADING
Form 1

Name: _____

Date: _____

Criterion: 20/21
Score ___ / 21

(6) 1. List 6 things to look for while proofreading a paragraph or report. Include a brief description of the errors and/or an idea of how to find and correct them.

_____

_____

_____

_____

_____

_____

_____

(10) 2. Proofread the following paragraph. Put a circle around each one of the errors which you can find.

In the field of transportation its likly that comercial submarines will be used to carry freight and passengers. Travle by submarine have advantages over travel by surface ship. For example distances between world ports are shorter by polar root under the ice than by way of the panama canal. Another advantage is that submarines are not threatened by bad wether.

(5) 3. Rewrite the preceding paragraph, correcting the errors.

Communications Item Progress Check

UNIT VI: WRITING PARAGRAPHS
ITEM D: PROOFREADING
Form 2

Name:_____

Date:_____

Criterion 17/20
Score ___ / 20

(6) 1. List 6 things to look for while proofreading a paragraph, or some other written work.

_____

_____

_____

_____

_____

_____

_____

(10) 2. Proofread the following paragraph. Put a circle around the mistakes.

Too weeks of rain have caused the fraser river to overflow it's banks. Now it is a muddy line that cuts the valley in half. Several farms lie under ninty feat off water. It looks as if vancouver will soon be flodded to.

(5) 3. Rewrite the preceding paragraph, correcting the errors.

Communications Diagnosis

UNIT VII : RESEARCH SKILLS

There is no written diagnosis for this Unit. You will instead write a test for each Item.

Begin this Unit by procuring the Learning Activities sheet for Item A. Read the Objectives, note the Learning Resources, and work your way through the first group of assignments.

When these have been completed, you will have to assess your own capabilities, and decide whether or not you are ready to write Item Progress Check A, form 1.

If you are properly prepared, you will complete the Progress Check successfully, and move on to Item B.

If however, you do not feel ready to try the Item Check after doing the first group of assignments, move directly on to the additional reading and exercises. When all of these have been completed, you then write Item Progress Check A, form 1. If you require further guidance or work, ask your instructor.

If you write form 1 of the Progress Check, but do not make the criterion, do the additional assignments and reading. If you feel you require further work and guidance, ask your instructor. Then write Item Progress Check A, form 2.

When you have read this diagnosis, make a note of the studies required on your weekly planning sheet. Then return this diagnosis to the files.

COMMUNICATIONS

UNIT VII: RESEARCH SKILLS

ITEM A: USING BOOKS

OBJECTIVES

The student must be able to:

1. Locate and identify uses of title page, copyright page, table of contents, preface, glossary, appendix, bibliography and index of a book.
2. Locate information in a book, using the index or table of contents.
3. State uses of references such as encyclopedias, almanacs, atlases and thesauri.
4. Read, interpret and prepare simple charts and diagrams.
5. Skim contents of a passage to find specific details.
6. Skim contents of a passage to get an overall view of main ideas.

LEARNING RESOURCES

Basic Reading Skills and answer key

Better and Faster Reading and answer key

English II and III

Work-a-text English 1 and 2 and answer keys

almanac, atlas, encyclopedia, thesaurus

LEARNING ACTIVITIES

1. Read p. 105 of Work-a-text English 2 and do the exercises. Now, look through the text books for Math. and Science used in this course. In each case, find the various parts and examine them. Are they always used in the way described in Work-a-text English 2? Check through at least 5 books, in each subject area.

2. Read and do the exercises on p. 152-3 of Basic Reading Skills. Again, check through the text books for Math. and Science used in this course, to see how the index and table of contents are used.

3. Read p. 107 of Work-a-text English 2. Do the exercise. If You can, go to a library and browse through the reference section. You will be surprised to see what can be found there! No question need be unanswered if you know how to use these references.

4. Read and do p. 156, 158-9, 161, 162 and 164-5 of Basic Reading Skills. It is important to understand charts and diagrams; they are commonly used as a quick means of getting information across.

5. Skimming is a special kind of reading. Find out what it is and practice it by using the exercises given. This work is in Better and Faster Reading on p. 190-199. For more practice, do the exercises on p. 200-206 of that book.

Now, do Item Progress Check VII A, Form 1. If you make the criterion, go on to Item VII B, if not, select work from the following references; look at each one before deciding whether to do it or not, each group of pages refers to a seperate topic.

6. Select from the following:

Basic Reading Skills	pp. 152-155, 157, 160, 163, 166, 176-178, 182-183, 184-187, 134-5
Better and Faster Reading	pp. 247-250, 250-252, 254-257 294-298
Work-a-text English 1	pp. 107, 109, 113, 119
Work-a-text English 2	pp. 89, 91, 93, 95
English II	pp. 106-108
English III	pp. 216-222, 223, 224-234 (answers on p. 243)

Now, do Item Progress Check VII A, Form 2. Remember to hand in the work you did for this Item, with your progress check.

Communications Item Progress Check

UNIT VII: RESEARCH SKILLS Name: _____

ITEM A: USING BOOKS Date: _____

Form 1

Criterion:	25 /27
Score:	___/27

1. What information would you expect to find in each of the sections of a book as listed below.
(8)

a. title page _____

b. copyright page _____

c. table of contents _____

d. preface _____

e. glossary _____

f. appendix _____

g. bibliography _____

h. Index _____

2. Using the textbook Mathematics, A Basic Course, write the page numbers you'd look at to find the topics listed below. Indicate whether you used the Table of Contents (T.C.) or Index (I.) to find the page numbers.
(4)

Topic	Page # s	Source of p. #
Scale Drawing	_____	_____
Rounding Off	_____	_____
Down Payment	_____	_____
Geometry	_____	_____

3. Matching. Match the name of the resource book with the topic you are looking for. That is, where would you look to find the information.
(5)

a.	Thesaurus	_____	Where the Zambezi River is.
b.	Atlas	_____	When Canada became independent.
c.	Encyclopedia	_____	Largest city (population) in the world.
d.	Almanac	_____	Population of Toronto
		_____	synonym for "gregarious"

4. For this question, you will need a copy of the Science book The Human Organism. Turn to page 49. Here is a diagram of a "Cross section of human skin" (Fig. 50). Complete the following questions about the diagram.
(5)

a. What is the second layer of skin called? _____

b. The sweat gland lies at the bottom of _____

c. Is fatty tissue found in the epidermis? _____

d. The hair root is surrounded by the _____.

e. In what layer of skin are nerve endings found? _____

5. Read through the following questions. Then, skim to find the answer.
(5)

Is aluminum a plentiful metal? _____

What % of the earth's crust is aluminum? _____

Name 3 metals known in ancient times _____

_____

Aluminum conducts both _____ and _____

What is the main idea of the selection? _____

_____

Aluminum is not scarce. It is the commonest metal on earth, far commoner than iron. Rock analysts calculate that it constitutes about eight per cent of the earth's crust. If enough aluminum were extracted from the earth, it would make a silvery shell five miles thick over the whole earth, embracing oceans and continents alike.

It is the only metal not known in ancient times, because it is a product of modern scientific research. Of the eight chief metals, silver, gold, copper, tin, zinc and iron were known in ancient times.

Aluminum has two natural properties which research improved. One is conductivity for heat. This makes it very useful in cooking utensils. Most of the heat energy from the fire is conductrd quickly to the food. The other is conductivity for electricity. Aluminum carries the electric current in the same size wire, more readily than any other metal except silver and copper.

Communications Item Progress Check

UNIT VII: RESEARCH SKILLS Name: _____

ITEM A: USING BOOKS Date: _____

Form 2

Criterion:	22/26
Score:	___/26

1. Matching: The phrases on the left describe information found in most books. Match these with the name of the book section
(8) where you'd expect to find the information.

a.	introductory explanation of book topic	_____	title page
b.	list of related books	_____	copyright page
c.	date of publication	_____	table of contents
d.	list of chapters, in order		
e.	list of information contained, (alphabetical)	_____	preface
f.	definitions of unusual words used in the book	_____	appendix
g.	name of author	_____	bibliography
h.	added charts and information to supplement chapters	_____	index

2. Use the textbook Physical Science - A Modern Approach. Next to each topic given, list the page numbers you'd expect to
(4) find most of the information on. Indicate whether you used Table of Contents (T.C.) or index (I.) to find the page numbers.

Topic	Page #'s	Source of p. #
What is Science	_____	_____
Valence	_____	_____
Ernest Rutherford	_____	_____
The Flight of Airplanes	_____	_____

3. What reference information would you find:

(4) a. in an encyclopedia _____

_____

c. in an atlas _____

_____

c. in a thesaurus _____

_____

d. in an almanac _____

_____

4. In your reading, you have found this chart. Look it over and answer the questions which follow.

(4)

Name	Mileage	Average annual repair bill	Avail. of Parts	Cost of car (new)	Imported or Canadian
AFFIX	21 mpg	$250	Good	$2895	Canadian
ZABA	25 mpg	$265	Fair	$3000	Import
AREBA	23 mpg	$300	Excellent	$2595	Canadian

Which car gets the best mileage? _____

Which car costs least for repairs? _____

Which car is likely to be repaired soonest if parts are to be ordered?

_____

Which car probably costs least to own for a year? (If all 3 get an average amount of use) _____

5. Read the following questions and then, skim through the reading selection to find answers to them.
(6)

a. When did Alaska gain admission to the U.S.? _____

b. What was the purchase price of Alaska? _____

c. From whom was Alaska purchased? _____

d. How many millions of dollars worth of minerals have been taken from Alaska's mines? _____

e. Name 3 major industries in Alaska _____

_____

f. What is the main idea of the selection? _____

_____

_____

Skim: Read for answers to the above questions.

When Secretary of State William H. Seward agreed, in 1867, to pay Russia $7,200,000 for Alaska, his judgment was ridiculed by an unknowing public. The land, a 586,400 square mile area, was characterized as a worthless, frozen waste. Russian trappers had already exhausted its supply of rich fur resources, as well as having practically eliminated the sea otter along its coast. Soon Seward's negotiation was honored with the epithet of "Folly," as was Robert Fulton's development, sixty years earlier, of the steamboat.

Yet, during the ninety-one year period preceding its admission into the union, Alaska's mines alone yielded more than $1,000,000,000 worth of gold, copper, silver, coal, lead, tin, platinum, and mercury. Fisheries and timber were other sources of great wealth.

COMMUNICATIONS

UNIT VII: RESEARCH SKILLS

ITEM B : SUMMARY SKILLS

OBJECTIVES

The student must be able to:

1. Write the main ideas of a passage in outline form.
2. Write a summary of a passage, including all the main parts, shortening the length to about ¼ of the original length.

LEARNING RESOURCES

Basic Reading Skills and answer key
English Workshop 9 and answer key
Work-a-text English 1 and 2 and answer keys
Exploring Occupations, Parmenter
Success in the World of Work, Parmenter and Gotlib

LEARNING ACTIVITIES

1. Begin your work for this Item by reading Basic Reading Skills, p. 142. You need not worry about the card format, simply examine the note making. Do the exercise on that page and on p. 146-7. In this last exercise, you do an outline from the reading. This is the kind of thing that you may do prior to making a summary.

2. You should now be ready to do an outline without the help provided in these exercises. Read p. 1-18 of Success in the World of Work. Now, prepare an outline for that chapter. Keep it short, no more than 1 page, and remember to include all the main points.

Mark your outline by comparing it to the sample on the following page.

3. Now, read p. 99 of Work-a-text English 2 and do the exercises. Mark your work.

4. You are now ready to make a summary of a longer passage. Read Chapter 2 of Success in the World of Work. As you read, make a mental outline of the points being covered. Now, reread the chapter, making a summary as you go over the material. Again, there is no one correct answer, so compare your work to the answer key provided. Did you include the same points? Is your summary too long? Did you include any unnecessary details.

Now, do Item Progress Check VII B, Form 1. If you do not make the criterion, do parts 5-7 below.

5. Select 2 books from the following and do the pages given.

Basic Reading Skills	p. 143-5 and 149
Work-a-text 1	p. 35 and 115
Work-a-text 2	p. 97 and 101 (Do B)
English Workshop 9	p. 231-2

6. Now, you should do an outline. Use p. 25-32 in Exploring Occupations.

These pages contain a number of excerpts on trends to be aware of in planning a career. Your task is to outline some of these. Outline Excerpt #2. Compare your outline to the sample provided on the following pages. If you need more practice, outline Excerpts 4, 6 and 9 in one outline (titled "Automation"). Again, compare your work to the sample.

7. Read p. 60-63 of Success in the World of Work. As you read, mentally pick outlthe main ideas. Reread the passage, writing a summary of these ideas.

To check your work, look at the points numbered 1-9 in italics at the beginning of each paragraph.

Did you mention all these points?

Did you make them shorter and more concise?

Is your summary brief?

Does it make the same point that the chapter covers?

Did you use your own words?

If you can answer 'yes' to all these questions, then you have made a good summary.

If you need more practice, choose some work to summarize and check it by answering the above questions about your work.

Now, do Item Progress Check VII B, Form 2. Remember to hand in the work you did for this Item, with your progress check.

ANSWER KEY

UNIT VII, ITEM B

2 - Outline Chapter 1 - Success in the Working World.

What Have you to Offer.

A. Introduction-

- why should you be hired?
- what can you offer?
- how can you improve?

B. Assess your Skills-

- use school to develop work habits
- consider skills at school and at home (hobbies etc.)
- prepare résumés and skills sheets
- plan for your future

C. Employers require people who are-

Ready - with education, skills, work habits, personality
Willing - to take time, learn, follow instructions, finish tasks
Able - to take time, responsibility, initiative and work with others.

D. Why finish school?-

- wider employment chances
- wider training available
- less limit to earnings
- more chance for advancement
- less likelihood of unemployment
- employers prefer high school graduates as having better work habits

E. Other considerations and conclusions-

- better students in school have better chance with employers
- part time employment should be related to career plans
- wide range of occupations require varied skills

3 - Sample Summary, Chapter 2, Success in the World of Work.

The second step in looking for a job involves finding the right vacancies. Jobs may be open because employees have retired, resigned, taken sick leave, been fired, or been promoted. Other jobs open when firms begin operations or expand and change needs. The vacancies are there, locate them.

Many ways are open to the job-seeker. He may act on tips from friends, fellow workers, relatives and former employers. He may set out to call on or write to local organizations that hire people with his skills. Employment agencies, both private and governmental may help him. Counsellors, at school or from clubs and service groups may provide information. Finally, he may look at newspaper ads and trade magazine reports to fill out the picture of vacancies.

Looking for a job is almost like having one. A person should expend time and energy in organizing his search. He needs to know what he is looking for and have a system for finding it. He has, first of all, to assess his own skills and abilities and examine the career areas that suit him. Then, he should register with placement agencies, in school and in the community. The counsellors may give more ideas of suitable fields.

Knowing what he is looking for, he can begin to look through trade magazines and directories, such as the Canadian Trade Index, for further leads. The yellow pages of a Telephone Directory list companies, he has only to sort out which ones are appropriate.

As the job seeker consults these references, he should keep in mind his personal interests in terms of the type of work, working conditions, supervision, pay, fringe benefits, hours, advancement and stability. He may also want to look at the possibilities for participating in decision making and his feelings about the company he'd be working for. Finally, he should look at his fellow workers, if possible, to determine if they would be good to work with.

The job seeker, if he wishes, can create his own part time jobs and, in some cases full time jobs. Even as a student, he could make himself available for such things as baby sitting, clerical work, odd jobs in house and garden, paper routes and grocery store jobs. He can create jobs by being specific about his skill meeting needs; in some cases, needs the employer is not even aware of.

The possibilities for finding a good job, including creating one, are limitless. The job seeker has only to put his energy and imagination into the search.

6 Sample Outline, Excerpt #2; p. 26 - Exploring Occupations

(Did you include all points?)

Introduction

- Good jobs go to trained, motivated people.

If you've got the job

- keep up with changes
- keep training current

If you are in school

- get all the education you can
- keep informed on your trade choices
- discuss your future with a vocational counsellor
- prepare for opportunities

#9, Sample Outline, Excerpts 4,6,9; p. 26-7 - Exploring Occupations

(Did you include all these points?)

Automation

Introduction

- automation is an economic necessity
- progress in automation can't be stopped

People are affected

- automation doesn't mean unemployment

  eg. Bell telephone, automated, needs far more people and can provide services at a reasonable rate, because of automation

- worker will need new skill
- automation raises standard of living

Industry is affected

- has new needs in terms of workers
- can provide goods and services at reasonable rates
- automation creates new possibilities
- some jobs will not be automated

  eg. custom tailoring needs 'personal touch'
  some word needs human judgement & personality

Communications Item Progress Check

UNIT VII: RESEARCH SKILLS Name: _____

ITEM B : OUTLINE AND SUMMARY - Date: _____

Form 1

Criterion:	26/ 29
Score:	___/ 29

For this test, you will need a copy of Success in the World of Work.

1. Complete the following outline for "How to Quit a Job" on page 84 of Success in the World of Work.

(10)

HOW TO QUIT A JOB

A. Introduction

- why do it properly
- _____
- _____

B. What not to do

- _____
- _____

C. What to do

- _____
- _____
- Give notice (allow some time before last day)
  - _____
  - _____

- _____

- _____

2. Write a summary of "Workmen's Compensation in Canada", (page 81-82 of Success in the World of Work). Use the space provided.
(19)

Communications Item Progress Check

UNIT VII: RESEARCH SKILLS Name: _____

ITEM B : OUTLINE AND SUMMARY Date: _____

Form 2

Criterion:	24/ 29
Score:	/ 29

For this test, you will need a copy of Success in the World of Work.

1. Complete the following outline for "Your First Job" p. 60 of Success in the World of Work. Do only the first 4 paragraphs.
(11) (About 1½ columns)

A. Introduction

- _____
- _____
  - getting on with your boss
  - _____

B. First Impressions Count

- don't be overly concerned
- _____
  - _____
  - _____

C. Considerations

- you were chosen to join the staff
- _____

D. Preparing for Day One.

- _____
- understand requirements and conditions
  - _____
  - _____
  - _____
- develop a self-improvement list for do's and don't

2. (18) Write a summary of "Application Forms and Special Tests" on page 46 of Success in the World of Work. Do only that page. (about 1½ columns) Use the space provided below.

COMMUNICATIONS

UNIT VII: RESEARCH SKILLS

ITEM C : LOCATING AND PRESENTING INFORMATION

OBJECTIVES

The student must be able to:

1. Research an occupation, using available books and references, summarizing the contents of pertinent sections.
2. Interview people in the community for further information on occupations, making notes on the interview.
3. Organize information and write a report, including a list of references, on the occupation researched.

LEARNING RESOURCES

Basic Reading Skills
English II and III
English Workshop 9
Work-a-text English 1 and 2
Exploring Occupations, Parmenter
Occupational Information Monographs
Success in the World of Work, Parmenter and Gotlib
Tools for Life - a series of 6 pamphlets

LEARNING ACTIVITIES

In this Item, you will put together the skills you have acquired in the previous Items and Units. Your work in the Item will form the basis of you Item Check mark, so follow directions carefully and do all parts.

Before you begin the work itself, take a few minutes to think about your future. What occupation interests you the most? What general occupational area does it fit into? Based on your thinking you are to select an occupational area to find out about. You will examine such things as qualifications, availability of jobs, day to day work load, advancement and remuneration.

Write your topic here _____.

1. Skim through the following readings, to remind yourself of the skills you worked on in the previous items.

Work-a-text English 2	p. 103, 105, 107, 109, 91, 93, 97, 99
Work-a-text English 1	p. 115

Don't do the exercises, unless you need them; this is just to refresh your memory.

Before you begin the actual research, you need to know exactly what you are looking for. Read through the "Check List for Investigating an Occupation" on p. 21-2 of Exploring Occupations. Prepare your own check list / outline for your research. You may be able to condense points, but be careful about eliminating any, they are all important.

To begin your research, read through the section in Exploring Occupations that concerns your occupational area. See the index for titles of these sections and note the questions and references at the end of the section. These may give you more ideas about other possible sources of information. Also, see p. 22-3 in Exploring Occupations.

Then, read the Occupational Information Monographs that apply to your occupational choice. For this work, remember to make notes and keep a record of what information came from which source.

You may have other sources of information available in your classroom, but, in any case you will go to your local library to carry out further research. Don't forget newspapers, magazines and trade journals. These can provide valuable information on current trends and issues.

Make notes and keep your references straight. Remember your work on outlines and summaries. When you have completely exhausted all written sources of information, you are ready to try another area.

2. Read through the following readings, to help prepare you for going out to do an interview. Pay special attention to the suggestions on introducing yourself and interviewing techniques.

English III	p. 159-161, 186-190
Work-a-text 1	p. 25, 27, 51, 53, 55
Work-a-text 2	p. 1, 3, 39, 43, 85

Also, before you begin your interviewing, outline the points you want information about. Consult the check list you prepared and, if necessary, write down the questions you want to ask.

Now, line up the interviews. Decide who you want to see and arrange to see them. It might be a good idea to start by interviewing a friend or acquaintance (friend of a friend?) who is actually working in a related job. He might be able to fill in details about the day to day work situation, but he may or may not know about future trends. Make sure you see people about the specific topics they might know about.

Other possible resources:

1. Your Instructor
2. Prospective Employers - what qualifications needed?
   - future trends
   - advancement, salary
3. Union Offices - same as above
4. Manpower Counsellors - as above, training available
5. Vocational School Instructors - whats involved in training
6. Apprenticeship Branch
7. Employment Offices: Federal, Provincial, Municipal, Private

This list should give you some leads. Phone for an appointment if necessary, and go ahead. If you wish to make notes during the interview, remember to ask the interviewer if it is all right. If not, make notes immediately after the interview, and add these (with a note about source) to your collection of notes on your occupational choice.

3. Skim -	English III	p. 105-6
	English Workshop 9	p. 231-7
	Work-a-text 1	p. 43, 47, 115, 117, 119, 121
	Work-a-text 2	p. 27, 29, 31, 35
	Basic Reading Skills	p. 143-149

You should do the exercises in your head; you need not write out your answers. These pages will refresh your memory on outlining and writing skills.

Now, prepare a final outline for your report. It will be similar to the outline you prepared for your research, but will change in order and possibly content, depending on the information you got.

Following that outline, you write your report. Think about it as you prepare it. Concentrate on your paragraphs and organization. The finished report should be about 4-6 pages in length, double spaced. Prepare another page listing the resources you used. Include the names of the books and magazines as well as the names and positions of the people you spoke to. See p. 121 of Work-a-text 1.

Now, proofread your report carefully and, if possible, have another student proofread it too. You will be marked on your report, for your Item Progress Check.

When completely ready, do Item Progress Check VII C, Form 1.

If you did not make the criterion, find out why, and re-do your report and organize your work. For Form 2, of the Item Progress Check, you will have to hand in your notes, outline and final report.

Communications Item Progress Check

UNIT VII: RESEARCH SKILLS Name: _____

ITEM C : LOCATING AND PRESENTING INFORMATION Date: _____

Form 1

Criterion:	26/ 30
Score:	___/ 30

1. For this Item Check, you will hand in the report you prepared in working through this Item. Before you hand it in, stapled
(25) to this page, check it over carefully for these things.

- Have you proofread it for punctuation, grammar and spelling?
- Have you used a variety of sentences?
- Is it well organized?
- Are all points covered?
- Have you included a list of resources?

2. Briefly describe an interview you did in preparing your report. How did you prepare for it; who did you see; what did you learn
(5) and how did it go?

_____

_____

_____

_____

_____

_____

_____

Communications Item Progress Check

UNIT VII: RESEARCH SKILLS Name: _____

ITEM C : LOCATING AND PRESENTING INFORMATION Date: _____

Form 2

Criterion:	23 / 30
Score:	___ / 30

1. Re-submit your report, having corrected all errors. Again, check it thoroughly before handing it in.

(25)

- Have you proofread it for punctuation, grammar and spelling?
- Have you used a variety of sentences?
- Is it well organized?
- Are all points covered?
- Have you included a list of resources?

2. Hand in your outline (the one you prepared as a basis for the report) and the notes you made from references and interviews. You need not rewrite these, hand them in, in the format that you originally made them in.

(5)

Communications Diagnosis

UNIT VIII; PERSONAL WRITING

There is no written diagnosis for this Unit. You will instead write a test for each Item.

Begin this Unit by procuring the Learning Activities sheet for Item A. Read the Objectives, note the Learning Resources, and work your way through the first group of assignments.

When these have been completed, you will have to assess your own capabilities, and decide whether or not you are ready to write Item Progress Check A, Form 1.

If you are properly prepared, you will complete the Progress Check successfully, and move on to Item B.

If however, you do not feel ready to try the Item Check after doing the first group of assignments, move directly on to the additional reading and exercises. When all of these have been completed, you then write Item Progress Check A, Form 1. If you require further guidance or work, ask your instructor.

If you write Form 1 of the Progress Check, but do not make the criterion, do the additional assignments and reading. If you feel you require further work and guidance, ask your instructor. Then write Item Progress Check A, Form 2.

When you have read this diagnosis, make a note of the studies required on your weekly planning sheet. Then return this diagnosis to the files.

UNIT VIII: PERSONAL WRITING
ITEM A: FORMS

OBJECTIVES

The student must be able to:

1. Organize the necessary information to fill out standard forms.
2. Complete standard forms used in business and personal affairs.

LEARNING RESOURCES

English II, Holt, Rinehart and Winston, Inc.

Work-A-Text in English 1, and answer keys, Cambridge

Work-A-Text in English 2, and answer key, Cambridge

Success in the World of Work, Parmenter and Gotlib

LEARNING RESOURCES

Your work in this Item should help you to organize and fill out forms in a neat and acceptable manner. Remember that you will often be judged by the appearance and organization of the forms that you write.

1. Read page 46 of Success in the World of Work, and then, on a seperate sheet of paper in your notebook, list all the information called for in the sample Application for Employment on page 48 and 49.

Remember to keep all this material handy so that you will be able to put it in your personal file, which you will compile at the end of this Unit.

2. Read page 141 to 146 in English II. You will notice that the text speaks of the Office of Internal Revenue, etc. As you can see this describes the American situation. In Canada, taxation is handled by the Income Tax Office.

3. Complete the forms on the following pages.

Complete this application form for employment.

APPLICATION FOR EMPLOYMENT

NAME _____ TELEPHONE _____

ADDRESS _____ AGE _____

MARITAL STATUS _____ SOC. INS. NO. _____

CONDITION OF HEALTH _____ WEIGHT _____ HEIGHT _____ SEX _____

NUMBER OF DEPENDENTS _____ WIFE (HUSBAND) WORK? _____

EDUCATION

HIGH SCHOOL GRADE COMPLETED _____ YEAR _____ SCHOOL _____

LIST OTHER EDUCATION

-- Course	year completed	school

EXPERIENCE: LIST ALL JOBS UNDER THE GIVEN HEADINGS. START WITH MOST RECENT OR PRESENT POSITION.

Employer	Position	From	To	Supervisor
-				

LIST 3 REFERENCES HERE

Name	Address	Telephone

DATE _____ SIGNATURE _____

Complete this application form for entrance to an upgrading program.

ADMISSION APPLICATION

DATE _____

PLEASE PRINT

Program Desired: _____

Date Program Begins: _____

Full Name: (Mr.) (Mrs.) (Miss) _____
(Surname) (Christian Names)

Home Address: _____

Marital Status: _____ Age: ___ Sex: ___

Date of Birth: Day ___ Month _____ Year _____

PREVIOUS SCHOOL RECORD:

Highest Full Grade Successfully Completed: _____

Year School Grade Completed: _____

Name and Address of School Last Attended: _____

_____

_____

Additional Training: _____

_____

_____

This application must be accompanied by the $25.00 Registration Deposit Fee and:

(a) An official statement of all high school marks, or
(b) A Certificate from the Principal of the last school attended.

Date: _____ Your signature: _____

Review the objectives for this Item. If you are sure that you can do them and no trouble with the forms above, write the Item Progress Check for this Item.

If you feel that more work in this area would be of value, or if you did not meet the criterion on the first form of the Item Progress Check, study the following.

4. Read Work-A-Text 1, page 17 and do the exercises on page 17.

5. Complete the following forms.

APPLICATION FOR EMPLOYMENT

Name _____ **Phone** _____

Address _____ **Age** _____

Marital Status _____ **Soc.Ins.No.** _____

Condition of health _____ **Wt.** _____ **Ht.** _____ **Sex** _____

Number of Dependents _____ **Wife(husband) work?** _____

EDUCATION

High school grade completed _____ Year _____

List other education

COURSE	YEAR COMPLETED	SCHOOL

EXPERIENCE: List all jobs under the given headings.
Start with most recent or present position.

EMPLOYER	POSITION	FROM	TO	SUPERVISOR

LIST 3 REFERENCES HERE

Name	Address	Telephone

Date: Signature:

1014

Complete this application form for entrance to a vocational school.

Application for Admission

ATLANTIC VOCATIONAL SCHOOL

Full name _____

Present address _____

Permanent address _____
(If different from present address.)

Age _____ Height _____ Weight _____ Sex _____
Social Ins.No. _____ Maiden name (if married woman) _____

Next of kin _____ Relationship _____

Address _____

PAST EDUCATION

Elementary School _____ Last grade completed _____ Year _____
High School _____ Last grade completed _____ Year _____

Other courses taken _____

_____

Specify the program you want to take: _____

_____

_____

Date _____ Signature _____

If you have been able to fill out the above forms in a presentable manner manner, try form 2 of the Item Progress Check. If you feel that you need more help, ask your instructor for special assistance.

Communications Item Progress Check

UNIT VIII: PERSONAL WRITING
ITEM A: FORMS
Form 1

Name_____

Date_____

Criterion: 15/15
Score: /15

(5) 1. Fill in this application form for admission to a training course in a community college.

ADMISSION APPLICATION

DATE _____

PLEASE PRINT

Program Desired: _____

Date Program Begins: _____

Full Name: (Mrs.) (Mr.) (Miss) _____ (Surname) (Christian Names)

Home Address: _____

Marital Status: _____ **Age:** ___ **Sex:** ___

Date of Birth: Day ___ Month _____ Year _____

PREVIOUS SCHOOL RECORD:

Highest Full Grade Successfully Completed: _____

Year School Grade Completed: _____

Name and Address of School Last Attended: _____

_____

_____

Additional Training: _____

_____

_____

Date: _____ **Your signature:** _____

1016

(5) 2. Complete this hotel registration form.

SPORTSMAN'S PARADISE HOTEL

WHERE THE FISH ARE BIG AND THE BEER IS COOL

NAME _____

ADDRESS _____

CITY _____

MAKE OF CAR _____ LICENCE _____

RM	RATE	DATE IN	DATE OUT

CHARGE ___ CREDIT CARD ___

(5) 3. Complete the following credit application.

NAME MR MRS MISS		OFFICE USE ONLY	TYPE / NO. OF CARDS / DATE
MAILING ADDRESS	APT. NO.—BOX NO.—R.R. NO. ETC.		F. CORR.
	NUMBER / STREET		DATE RECEIVED / DATE
	CITY OR TOWN / ZONE / PROVINCE		
PHONE	BUSINESS / RESIDENCE	BANK	NAME / BRANCH
MARRIED YES ☐ NO ☐	OWN HOME YES ☐ NO ☐	OVER 21 YES ☐ NO ☐	HOW LONG AT ABOVE ADDRESS
IF LESS THAN ONE YEAR AT ABOVE ADDRESS, PLEASE GIVE PREVIOUS ADDRESS		FINANCE COMPANY	NAME / OFFICE
PRESENT EMPLOYER	NAME / ADDRESS	OTHER CHARGE ACCOUNTS	NAME / NAME
YEARS OF SERVICE	OCCUPATION		
IF LESS THAN ONE YEAR WITH PRESENT EMPLOYER, PLEASE GIVE NAME & ADDRESS OF PREVIOUS EMPLOYER	NAME / ADDRESS	CORRESPONDENCE ☐ ENGLISH ☐ FRENCH	OPERATOR'S LICENSE NO.
		NO. OF CREDIT CARDS DESIRED	TO BE USED FOR CAR ☐ TRUCK ☐ BOAT ☐
IF SINGLE, PLEASE GIVE NAME & ADDRESS OF A CLOSE RELATIVE	NAME / ADDRESS	IF CORPORATION OR PARTNERSHIP PLEASE GIVE AUTHORIZED SIGNATURE	NAME / TITLE
		SIGNATURE ▷	
		DATE ▷	

Communications Item Progress Check

UNIT VIII: PERSONAL WRITING
ITEM A: FORMS
Form 2

Name _____

Date _____

Criterion: 10/10

Score: /10

(5) 1. Fill in this credit application.

CONFIDENTIAL APPLICATION

PLEASE INDICATE BY A (√) WHICH ACCOUNT YOU ARE APPLYING FOR. ▶ ☐ ***REGULAR TERMS*** UP TO 24 MONTHS (2 YEARS) TO PAY ON PURCHASES ☐ ***EXTENDED TERMS*** UP TO 36 MONTHS (3 YEARS) TO PAY ON PURCHASES OF $400.00 OR OVER

PLEASE ANSWER ALL QUESTIONS BELOW. GOODS CANNOT BE SHIPPED UNTIL YOUR APPLICATION IS APPROVED BY OUR CREDIT DEPARTMENT. ALL INFORMATION WILL BE KEPT CONFIDENTIAL.

PLEASE PRINT YOUR INFORMATION

MR. MRS. MISS (FAMILY NAME) (FIRST NAME) (SECOND NAME)

HUSBAND'S OR WIFE'S FULL NAME | YOUR TELEPHONE NO.

ADDRESS (NO. AND STREET, R.R. NO., P.O. BOX) CITY OR POST OFFICE PROV. | HOW LONG AT PRESENT ADDRESS?

FORMER ADDRESS | HOW LONG AT THIS ADDRESS?

AGE | ARE YOU ☐ SINGLE? ☐ MARRIED? ☐ WIDOWED? | HOW MANY DEPENDANTS? | DO YOU ☐ OWN? ☐ RENT? ☐ BOARD?

OCCUPATION (IF ARMED FORCES, GIVE REGIMENTAL NO.) | IF FARMER, TOTAL FARM ACREAGE? | ACRES UNDER CULTIVATION?

EMPLOYER (IF MARRIED WOMAN, GIVE HUSBAND'S OCCUPATION AND EMPLOYER) | HOW LONG?

PREVIOUS EMPLOYERS (IF UNDER TWO YEARS WITH PRESENT EMPLOYER) | HOW LONG?

EARNINGS $ ☐ WEEKLY ☐ MONTHLY ☐ YEARLY | FAMILY ALLOWANCES, ETC. (SPECIFY) $

OTHER SOURCES OF INCOME (IF WIFE WORKS, GIVE YEARLY INCOME AND NAME OF EMPLOYER)

NEXT OF KIN (OTHER THAN HUSBAND OR WIFE—GIVE NAME AND ADDRESS)

IF YOU NOW HAVE AN ACCOUNT—WHAT KIND? | AT WHAT STORE OR OFFICE?

ACCOUNT NUMBER | IS IT PRESENTLY ☐ OPEN? ☐ PAID OFF? | WHEN PAID IN FULL? 19

BANK NAME (BRANCH AND ADDRESS)

REFERENCES BUSINESS (CREDIT OR OTHERWISE)

1. NAME / ADDRESS

2. NAME / ADDRESS

(5) 2. Complete this job application form.

APPLICATION FOR EMPLOYMENT

Name _____ Phone _____

Address _____ Age _____

Marital Status _____ Soc.Ins.No. _____

Condition of health _____ Wt. _____ Ht. _____ Sex _____

Number of Dependents _____ Wife(husband) work? _____

EDUCATION

High school grade completed _____ Year _____

List other education

COURSE	YEAR COMPLETED	SCHOOL

EXPERIENCE: List all jobs under the given headings. Start with most recent or present position.

EMPLOYER	POSITION	FROM	TO	SUPERVISOR

LIST 3 REFERENCES HERE

Name	Address	Telephone

Date: Signature:

UNIT VIII: PERSONAL WRITING
ITEM B: BUSINESS LETTERS

OBJECTIVES

The student must be able to

1. Write a business letter in an acceptable format.
2. Address an envelope in acceptable fashion.
3. Write a letter requesting particulars of a job and requesting an application form.
4. Write a letter of application for a job.

LEARNING RESOURCES

English II, Weinhold

English III, Wachner

Work-A-Text in English 1, and answer keys, Cambridge

Work-A-Text in English 2, and answer keys, Cambridge

English Workshop 9, and answer keys, Harcourt Brace

Success in the World of Work, Parmenter and Gotlib

Business English Essentials, Henderson and Voiles

LEARNING ACTIVITIES

Some of the most important writing we do in our lives involves business letters. For this reason it is a good idea to be able to write an effective letter. The following activities have been designed to increase your skill in this vital area.

1. An excellent sample of a business letter is carried on page 244 of English Workshop 9. Read page 244 to page 247.
2. Read page 41 up to the "For Further Reading" section on page 43 of Success in the World of Work. In addition to this compare the two letters on page 44 and 45.
3. Read English II from page 137 to 140.

4. Write a business letter to a retail store explaining a problem (detailed below) and suggesting some acceptable solutions.

Suppose you recently purchased a small appliance from a large department store, and found after only two months, that it does not work as well as it should. You are not sure if it is still covered by warranty, and you no longer have the sales slip. But you do want some help--repairs, replacement, or perhaps your money back.

Write the letter in such a way that you firmly state what you want, but at the same time you must not antagonize the company or offend the reader, for in that case, you probably will get nothing. Write your assignment on a separate sheet of paper.

Look over the objectives for this Item. If you feel that you can do them without any problems you do not need to do any more work at this level and you should write Item Progress Check VIII - B. form 1.

If you do need more work or you did not make the criterion, do any <u>two</u> or more of the following:

5. Read <u>English III</u> from page 108-111.

6. Read <u>Work-A-Text 1</u>, page 89, 91 and 93.

7. Read <u>Work-A-Test 2</u>, page 59, 61, 62 and 63.

In addition to this reading, do <u>one</u> of the following and hand it in, stapled to the back of your next Item Progress Check. Before you hand it in, make sure you have it checked by another student for errors.

8. Write a business letter to a national magazine saying that you paid for a subscription more than three months ago but you still have seen no sign of the magazine. Use the magazine's real address or make one up.

9. Select a help wanted advertisement from the local newspaper and write a letter of application for the job. Hand in the advertisement with the letter.

If you have completed the minimum work required above, write form 2 of the Item Progress Check for this Unit.

Communications Item Progress Check

UNIT VIII: PERSONAL WRITING
ITEM D: BUSINESS LETTERS
Form 1

Name_____

Date_____

Criterion: 22/25
Score: /25

1. (10) On a separate piece of unlined paper, write a letter to the Eastern Vocational College, St. John's, Newfoundland, for an application form and information about a course as a library assistant. Be sure that your letter complies with all the principles of good business writing.

2. (10) On a seperate sheet of unlined paper, write a letter to apply to one of the following positions. When these letters are completed, attach them to this sheet and hand them in to be marked.

   a. RETAIL CLERKS WANTED: New department store requires clerks in all departments. Apply in writing to Personnel Dept., Whittam Stores Ltd., Box 2400, Whitehorse, Yukon Territory.

   b. SALES TRAINEE: Wanted by national firm in the automotive supply business. Salary, car and expenses. Training on the job. National Tire Ltd., 5300 Central Ave., Vancouver 8, B.C.

3. (5) Address the envelope below, for the letter in question 2.

Communications Item Progress Check

UNIT VIII: PERSONAL WRITING
ITEM B: BUSINESS LETTERS
Form 2

Name_____

Date_____

Criterion: 20/25
Score: /25

(10) 1. Attach the letter you finished in preparation to write this Item Progress Check.

(10) 2. On a separate sheet of unlined paper, write a letter to apply for one of the following jobs and attach it to this sheet. Be sure that your letter complies with all the principles of good business writing.

a. PIPELINE CONSTRUCTION: Help wanted. Write for information and application to Northwest Industries Ltd. 5600 Nothern Way, Kamloops, B.C.

b. HOSPITAL STAFF WANTED: Several positions. On the job training. Write for particulars and application to Box 3342, Winnipeg Free Press, Winnipeg, Manitoba.

(5) 3. Address the envelope below, for the letter in question 2.

COMMUNICATIONS

UNIT VIII: PERSONAL WRITING
ITEM C: RESUME

OBJECTIVES

The Student must be able to:

1. Write an effective resume.

2. Write a covering letter to go with a resume.

LEARNING RESOURCES

Notes in LEARNING ACTIVITIES

Business English Essentials - Henderson and Voiles

LEARNING ACTIVITIES

An effective resume will be of great assistance in obtaining a job. Actually you will probably never get an offer to work on the basis of your resume, but it will get you an interview in which you will be able to sell yourself to an employer. For this Item you will be required to complete an effective resume, like the ones that follow. Remember that a great deal of initial judgement will be based on the resume so "put your best foot forward" and do the best you can. Start by doing a rough draft and finish with a final copy that is as neat and comprehensive as possible. Follow the outline below.

1. Your name, address and telephone (be sure to give a number where you can be reached during the day)

2. Objective: tell the employer what your ultimate goals are.

3. Work experience: month, year (start with your most recent job)
   name of company, address, telephone
   position: (title)
   duties: (give detailed description of job)
   reference: (name of supervisor, manager, etc.)
   reason for leaving:

4. Work experience: as above

5. Work experience: as above

6. Related experience: list in short sentences

7. Equipment I can operate

8. Education: Public school, trade courses, on the job training

9. Personal data: height, weight, health, marital status, SS#

10. Hobbies: list only a few

11. References: list three work and/or character references

12. If indicated, list: the type of position desired

List any other information that you feel may be pertinent to the position that you are applying for. Try not to exceed one page in length. Check the following resumes to get an idea of what can be done.

You should always enclose a covering letter with a resume. The covering letter is similar to a letter of application but it will not include the specifics that are listed in the resume. For this Item you must also make a covering letter to accompany your resume. Select an advertisement in the newspaper and write a covering letter to go with your resume and aimed at this particular job vacancy.

The covering letter should:

1. be written in business style.

2. direct the reader's attention to the position applied for.

3. tell how you heard of the vacancy.

4. arouse the reader's interest.

5. request an interview.

When you have completed a final draft of your resume and covering letter, you are ready to write Item Progress Check VIII - C, form 1.

If you do not make the criteria on the check do the following extra work. Find out which parts of the work you did not understand or do well. It might be a good idea to go over your Item Progress Check with your instructor. Make any changes in your work that are required. After completing this you should be ready for form 2 of the Item Progress Check.

MAIRRIS, Rita Eileen
221 Fisgard Street
Victoria, B.C.

Telephone: 382-6589

OCCUPTATIONAL GOAL: Clerk - Receptionist

WORK EXPERIENCE:

Xmas 72 — Victoria Post Office, Xmas sorting for carriers, including blocking, apartments sorting etc.

Jan. 70 to Oct. 72 — Zimmerman's Hardware, waiting on customers, operating the cash register, taking stock, stocking shelves, etc.

May 67 to Sept. 69 — Sunset Resorts: babysitting, laundry, book guests, organize weekly barbecue, clean owner's house, etc.

EDUCATION: High School Graduate (Gulf Islands Secondary 1967) Able to speak and understand French. Majored in commercial program.

Completed Clerk - Typist training at Dreyfus Commercial College. Ranked 5th in a class of thirty. Final typing speed of 71 wpm.
Jan. 73 to June 73

EQUIPMENT I CAN OPERATE: typewriter, duplicator, postage meter, cash register, dictaphone, switchboard.

HOBBIES AND INTERESTS: Sewing, square dancing, piano playing, art

PERSONAL DATA:
Age 22
Height 5'4"
Weight 153 lbs.
Health excellent
Social Insurance # 713-534-625

REFERENCES:

Mr. R.J. Simpson, Director
Victoria Post Office,
Victoria, B.C.

Mr. A.L. Zimmerman,
C/O Zimmerman's Hardware
2255 Station Ave.
Victoria, B.C.

Mr. E.B. White, Instructor
Dreyfus Commercial College
1311 West Hastings St.
Vancouver, B.C.

GARDENER, WILLIAM L.
21-1153 Burnaby Street
Vancouver 1, B.C.

Telephone: 628-3487

OCCUPATIONAL GOAL: My objective is to become journeyman carpenter.

WORK EXPERIENCE:

Aug. 71 to Feb. 72 — Employer: Advance building construction, 102 west 1st. Duties: Clearing brush, digging trenches, pouring concrete, landscaping.

June 68 to June 71 — Royal Canadian Armed Forces (Infantry P.P.C.L.I.) Medical Orderly-first aid

Jan. 66 to June 68 — Homestead Conduit Ltd., 195 Angus Way, Toronto 5. Duties: Delivering supplies to construction sites and checking invoices.

July 64 to Oct. 65 — Apple Bros. Bakery, 5376 Richler Avenue, Toronto 3. Duties: Van boy - loading bread trucks, making deliveries and collections with the driver.

EDUCATION:

Brock High School, Hamilton, Ont.
Completed Grade 9 in June 1963

B.T.S.D. Level III (Grade 10)
B.C. Vocational School, Burnaby
March 72 to July 72

Carpentry Pre-Apprenticship Course
B.C. Vocational School, Burnaby
Sept. 72 to March 73

EQUIPMENT I CAN OPERATE: All carpenter's hand tools, cement mixer, power tools, utility vehicles.

HOBBIES AND INTERESTS: Music, sports, photography, reading

PERSONAL DATA:

Age - 25
Birthdate - February 4, 1949
Marital Status - Single
Soc. Ins. No. - 708-342-238

REFERENCES:

Mr. Derek Smith, superintendant
Advance Construction
5862 Lucas Cresent, Van. 16

Mr. S.W. Rodgers
3323 W. 36th
Vancouver, B.C.

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Communications Item Progress Check

UNIT VIII: PERSONAL WRITING
ITEM C: RESUME
Form 1

Name_____

Date_____

Criterion: 18/20
Score: /20

For this Item Progress Check you will submit the resume and covering letter that you have completed for marking. Make sure that there are no errors or blemishes on your final drafts and staple them to this Item Progress Check. They will be marked out of 10 each alotted according to the principles of good resume and letter writing.

Communications Item Progress Check

UNIT VIII: PERSONAL WRITING
ITEM C: RESUME
Form 2

Name_____

Date_____

Criterion: 19/20

Score: /20

For this Item Progress Check you will re-submit your resume and covering letter. At this point they should be letter perfect so go over them quickly to see if you have eliminated all of the errors.

COMMUNICATIONS

UNIT VIII: PERSONAL WRITING
ITEM D: PERSONAL RECORD FILE

OBJECTIVES

The student must be able to:

1. Compile a personal record file with information that will be of value in his occupational future.

LEARNING RESOURCES

1 file folder

LEARNING ACTIVITIES

In today's competitive job market it is necessary to compile a record file that contains all the personal information that is needed for job searching. For this Item you will make such a file. If you already have one, you will be able to add the contents of this to it. In any event, when you leave this course, you will have a complete file to assist in filling out application forms.

1. Buy or otherwise obtain a letter size file to collect all personal and educational information you will need. If you have access to a photo-copier, make copies of the important documents that an employer might wish to see (birth certificates, union cards, social insurance cards, drivers's licences, training certificates, etc.).

2. Place the personal information sheet that you prepared for Item A, plus the resume and covering letter that you wrote to go along with it. You can also place your Occupational Report from Unit VII in this file.

You should now be ready for Item Progress Check VIII - D.

If you did not make the criterion, do the following:

3. Find out which parts of the work you did not understand. Go over your Item Progress Check with your instructor if needed. Make any changes in your file that are required.

Write Item Progress Check VIII - D, form 2.

Communications Item Progress Check

UNIT VIII: PERSONAL WRITING
ITEM D: PERSONAL RECORD FILE
Form 1

Name_____

Date_____

Criterion: 8/8

Score: /8

For this Item Progress Check you will submit the personal record file that you have created with this Item Progress Check. Make sure that the file you have created contains all of the information that you may require for filling out application forms, etc. Your file will be marked on the amount of valuable information that you have been able to include. When your file is returned, make sure that you keep it in a safe place as it will be of considerable value.

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Communications Item Progress Check

UNIT VIII: PERSONAL WRITING
ITEM D: PERSONAL RECORD FILE
Form 2

Name_____

Date_____

Criterion: 8/8

Score: /8

At this point your file should be ready to be re-marked. Make sure that you have included any omissions and hand it in with this sheet.

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COMMUNICATIONS DIAGNOSIS

UNIT IX: WRITING COMPOSITION

There is no written diagnosis for this Unit. Instead you will work through each Item and write the Item Progress Check.

Begin this Unit by getting the Learning Activities sheet for Item A. Read the Objectives, note the Learning Resources, and work your way through the assignments.

When you have completed the work outlined, re-examine the Objectives and assess your progress. If you are sure you have mastered the Objectives, you can write Form 1 of the Item Progress Check. If you do not feel prepared for the Progress Check, continue work on your assignment until you are satisfied.

Once the Check is written, you do one of two things. If you were prepared for the Check, you made the criterion; go on to Item B, get the Learning Activities sheet and proceed as before. If you did not make the criterion, re-do your work as directed. Then, write Form 2 of the Item Progress Check.

When you have read this Diagnosis sheet, make a note of the studies required on your weekly planning sheet, and return this diagnosis sheet to the files.

UNIT IX: WRITING COMPOSITION

ITEM A: NARRATIVES

OBJECTIVES

The student must be able to:

1. Write an effective narrative composition of 450-550 words.

LEARNING RESOURCES

Work-a-text: English 1 and 2 and answer key

LEARNING ACTIVITIES

1. Read and do the exercises on pages 1, 3, 5, 7, 9, 11, and note the points given on page 13 of Work-a-text English 1. Writing a story is writing a narrative.

2. Read pages 53, 55 and 57 of Work-a-text English 2. Pay special attention to the list on page 57. It will serve as a checklist for your composition.

3. Developing your composition. Most narrative compositions are developed in chronological order, that is, in time order. As with most stories, a narrative of events is given in the order that the events happened. The initial paragraph sets the scene and begins the action. The following paragraphs continue the action, in order until the conclusion. Breaks between paragraphs are usually made where there are breaks or pauses in the action.

Sometimes, however, the composition is put in a different order. The author may begin his story in the middle or even at the end, and then go back to the beginning. This technique is like the "flash-back" technique often used

in films and television productions.

Consider this sample paragraph from one of the Reading tests:

I heard a loud splash and turned around just in time to see Jack fall into the water. It had happened this way. Jack and Tom had rowed the boat to the shore. Tom had jumped out of the boat as they neared the shore, to pull the boat out the rest of the way. Just as Tom started to pull, Jack stood up and, when Tom pulled, Jack did a back flip into the water. He yelled, while the rest of us stood on shore and laughed.

Notice that the order is not exactly as the events happened. The author did this to catch the readers attention. It is not always effective, (you must have heard some jokes that are ruined by hearing the punch-line first) but can often be used by a skillful writer.

4. Now, you are to write a narrative composition, keeping in mind all the points you have picked up in your work. You may use one of these topics or choose one of your own.

   (a) The greatest surprise of my life.
   (b) An experience of a bargain hunter.
   (c) How I earned my first dollar
   (d) An experience I shall not forget.
   (e) The day I should have stayed in bed; Everything went wrong.

NOTE: - Reread the assigned pages, if necessary; the points covered will all be considered in marking your composition. You will hand in your final copy for the Item Progress Check so, when it is completely ready, get the Item Check form 1 and hand in your work.

- Your composition must be 450 - 550 words. Double space your final copy
- Proofread for spelling, punctuation, capitalization, grammar, sentence structure, paragraph structure, variety in sentences and paragraphs, unity and development of your composition.

If you do not make the criterion on form 1, you will revise your final copy, making the needed corrections and improvements. When ready, do Form 2 of the Item Progress Check for Unit IX - Item A.

COMMUNICATIONS ITEM PROGRESS CHECK

UNIT IX: WRITING COMPOSITION

ITEM A : NARRATIVE

FORM 1

Name:_____

Date:_____

CRITERION 18/20
SCORE_____/20

Hand in the narrative composition that you prepared in doing the Learning Activities for this item. Your final copy should contain no errors in punctuation, grammar, spelling, sentence structure and overall development.

TEACHERS COMMENTS:

Communications Item Progress Check

UNIT IX: WRITING COMPOSITIONS

ITEM A : NARRATIVES

FORM 2

Name:_____

Date:_____

Criterion 17/20
Score____/20

Reread the composition you handed in for the Form 1 Item Progress Check. Carefully check the errors noted and suggestions made by your instructor.

Re-write the composition, again double spacing it. Correct all errors and improve the writing wherever you can.

Staple the re-written composition with the original, to this sheet and hand them in for marking.

TEACHERS COMMENTS:

Communications

UNIT IX: WRITING COMPOSITIONS

ITEM B : DESCRIPTIVE

CBJECTIVE

The student must be able to:

1. Write an effective description composition of 450-550 words.

LEARNING RESOURCES

English Workshop 9

Work-a-text 1 and 2

LEARNING ACTIVITIES

Writing a description is like taking a good picture. Your words must present a clear picture to your reader. You must tell the reader your observation point and fill in the details of the picture. As with narration, there must be some order to your description, and you should use accurate and highly descriptive words.

1. The first step in a description is observation. You must study the object or scene to be described carefully, so as to notice all the details that you want to include. Try this out by looking out the classroom window or looking around inside the class. Observe it carefully and think about what you are looking at. Remember, you needn't restrict yourself to sight. Think of sound, smell and maybe even taste.

2. Having looked at the scene, select your point of view. You don't take a picture without first deciding where you want the camera and what your picture is to include. The same is true of a word picture. This observation point is the first thing you will deal with in your composition. It would be your introductory paragraph.

3. Developing your topic - with a description, you have many more ways to develop your paragraph then with a narrative. Some suggestions are:

   (a) General to specific: give a general, overall view of the scene and then develop by adding specific details.

   (b) Sight-order; describe a scene from left to right or from background to foreground.

   (c) Moving point of view; the eyes or camera lens move through the scene.

For example, you might describe what you see as you go crashing through a thick forest. Remember, you are describing the scene, not narrating the action. Your movement must take a back seat to your description.

4. Read pages 211-213 in English Workshop 9 and do the exercises outlined. Do also pages 70, 72 and 74 of Work-a-text English 1 and pages 40 and 42 of Work-a-text English 2. The way that you use descriptive words is very important in a descriptive composition.

Do the following exercise:

List five words or phrases (without rep tion) that you could use to describe each of the following:

(a) the sounds in a classroom
(b) eating an orange
(c) the feel of snakeskin
(d) the smell of dinner being cooked
(e) a bonfire burning
(f) sunrise
(g) waking on the beach

Try to use words that are rich in description.

5. Now, write a descriptive composition, keeping all these points in mind. You may use one of the topics below, or choose one of your own.

(a) The city at night
(b) My best friend
(c) My dream house
(d) A umptuous feast

NOTE:
- This is to be a description only, of 450-55 words in length
- Double space your final copy
- Proofread for spelling, punctuation, capitalization, grammar, sentence structure and variety, paragraph structure and development. All of these things will be considered when it is marked.

When you have completed your final copy, get the Item Progress Check Form 1, for this item.

If you did not make the criterion on the Item Check, rewrite your composition, making the necessary improvements and corrections. Get the Item Progress Check Form 2 and do it.

COMMUNICATIONS ITEM PROGRESS CHECK

UNIT IX: WRITING COMPOSITION

ITEM B : DESCRIPTION

FORM 1

NAME:_____

DATE:_____

CRITERION	18/20
SCORE	_____/20

Hand in the descriptive composition that you prepared in doing the Learning Activities for this Item. Your final copy should contain no errors in punctuation, grammar, spelling, sentence structure and overall development.

TEACHERS COMMENTS:

Communications Item Progress Check

UNIT IX : WRITING COMPOSITIONS

Name:_____

ITEM B : DESCRIPTIVE

Date:_____ _____

Form 2

Criterion	17/20
Score	_____/20

Reread the composition you handed in for the Form 1 Item Progress Check. Carefully check the errors noted and suggestions made by your instructor.

Re-write the composition, again double spacing it. Correct all errors and improve the writing wherever you can.

Staple the re-written composition with the original, to this sheet and hand them in for marking.

TEACHERS COMMENTS:

UNIT IX: WRITING COMPOSITION

ITEM C : EXPOSITORY

OBJECTIVE

The student must be able to:

1. Write an effective expository composition of 450-550 words.

LEARNING RESOURCES

English III

English Workshop 3

Work-a-text English 1 and 2 and answer keys

An expository composition is one that explains. It may explain how to do something or why something is the way it is. Sometimes it is also used to explain a process or event thoroughly.

1. Choosing a topic - Selecting a suitable topic for an expository composition is not difficult. Almost any topic is suitable for exposition; choose one that interests you and one that you can make interesting to your reader. Be sure your subject is narrow enough to be handled in 450-550 words. but not so narrow that you can't think of enough to say. Do the following exercise on topics.

Pick the expository topic from each set, that is best suited to a 450-550 word composition.

a) Preparing to look for a job.
   The resume
   The letter of application

b) Medicine
   Methods of fighting disease
   The salk vaccine

c) Refoerestation
   Conservation
   The importance of forests

d) Winter and summer sports
   Ice skating
   Winter sports

Be prepared to justify your choice and go over the topics with your instructor to find out if you are correct.

2. Methods of development. Read pages 225 to 229 in English Workshop 9, and do the exercises given. Although these are methods of development for a paragraph, they can also be used for a composition. Read also the following explanations of other methods of development.

SUPPLYING DETAILS: One way of developing a paragraph is by adding details. Paragraphs thrive on details.

Specific details which often answer the questions "What?" and "How?" may be used to develop or explain a general statement made in the topic sentence. Details make more vivid a word picture of a person, place, thing, or event. If you make a general statement, that Helen is well dressed you may make the picture clearer by describing her clothing, the colour scheme, the accessories, and the neatness and appropriateness of her outfit. It's the specific facts that put the paragraph across.

SUPPLYING EXAMPLES: To make an explanation clear or to prove a point, give examples or illustration, You may discuss fully one example or refer briefly to severla. If you say " The twentieth century has seen great progress in science, " you may prove your point by discussing in detail one discovery, such as television, or by briefly mentioning several---television, space technology, and others

USING COMPARISON: If you were describing a tiger to a small child who had never seen one, you would probably compare it to a cat. If you were describing how a child was educated in a Communist country, you would contrast his education with a child's schooling in a Democracy. In describing to boys and girls the appearance of the human brain, one doctor compared it to a cauliflower. The doctor was trying to explain the appearance of something unfamiliar by showing that it is like something familiar to his audience. Comparisons (showing how two things are alike or different) and contrasts (showing how two things differ) help to clarify our ideas. All the points on one side may be balanced against all the points on the other side, or the two objects may be compared a point at a time.

Most methods are similar and it is not necessary to stick closely to any one. The important thing is to use a structured method of development and not let your ideas wander around. You may choose the order you put them in, but make it logical and cohesive.

3. Outline: With this type of composition, it is essential to outline your topic. It is not as easy to form a mental picture of the final product as it is with narration or description. Read Work-a-text English 1 pages 35, 37, 43, and Work-a-text English 2, pages 25, 27, and 29. Read also English III, pages 105-107 and English Workshop 9 pages 231-237. Do any exercises that you feel will help you.

4. Now, write an outline for your composition. You may use one of the topics below or choose one yourself.
   a) How to plan your daily work
   b) My favorite hobby (Explain it)

c) Canada's Future
d) Looking for a job
e) Major industries in this area.

In your outline, you should include your major points and the details or points you are going to cover. Reread the pages assigned above, if necessary.

5. You are now ready to write your composition. When you write your final draft, make it 450-550 words long, and double space it on the page. Proofread it for spelling, punctuation, grammar, sentence structure and variety, paragraph structure, unity, development and overall unity.

You are now ready for Item Progress Check, Unit IX, Item C. Form 1. Get the Item Check and do it.

If you do not make the criterion, do Form 2, but before you do it, correct and make the necessary changes in your composition and outline.

COMMUNICATIONS ITEM PROGRESS CHECK

UNIT IX: WRITING COMPOSITION

ITEM C : EXPOSITORY

FORM 1

Name: _____

Date: _____

CRITERION 22/25
SCORE _____/25

Hand in the outline for an expository composition that you prepared for this Learning Activities for this Item. Staple it to this sheet.

Hand in the expository composition that you prepared for the Learning Activities for this Item. Staple it to this sheet also. Make sure that you proofread it thoroughly before you hand it in.

TEACHERS COMMENTS:

Communications Item Progress Check

UNIT IX: WRITING COMPOSITIONS

ITEM C : EXPOSITORY

Form 2

Name: _____

Date: _____

Criterion	17/20
Score	_____/20

Reread the composition you handed in for the Form 1 Item Progress Check. Carefully check the errors noted and suggestions made by your instructor.

Re-write the composition, again double spacing it. Correct all errors and improve the writing wherever you can.

Staple the re-written composition with the original, to this sheet and hand them in for marking.

TEACHERS COMMENTS:

COMMUNICATIONS

UNIT IX: WRITING COMPOSITION

ITEM D : ARGUMENT

OBJECTIVE

The student must be able to:

1. Write an effective argument with adequate support on a current topic. The composition must be 450-550 words long.

LEARNING RESOURCES

Better and Faster Reading

Writers in Conflict

LEARNING ACTIVITIES

Have you ever listned to children engaging in what passes with them for argument? Their "arguments" tend to follow this pattern.

"My dog is better than yours."

"He isn't!"

"He is!"

"He isn't!"

"He is!"

Such dialogues are not argument but wrangling, and convince no one. They are not confined by any means to children.

We frequently hold opinions and beliefs without knowing, ourselves, why we hold them. But if we wish to convince others, we must give satisfactory reasons. These reasons have thier greatest effect if they are clear and logical, and are expressed with force and vividness. You will get a good deal of fun out of doing this kind of thing, if you press your arguments with spirit and do not spare the horses. Flog your opponent hard but do it grammatically and with the forms of politeness. Use all the resources of narrative, description and explanation to buttress your argument.

1. Read Better and Faster Reading pages 217 to 225. These pages list some of the methods that can be used to persuade a reader. Although the intent is to make you aware of these devices as you read; you can also be aware of them as you write and use them in building your argument. The key is to avoid certain methods and pick up on others. Logic is necessary and factual support is generally better than opinion. Generalizations and false or misleading conclusions should be avoided. You should read through some articles in Writers in Conflict and analyse the methods used to persuade the reader.

2. Methods of Development - These have been well covered in previous items, so review them if necessary. The most common methods used are:
   1) definition and examples
   2) comparison and contrast
   3) reasons

   You may also be using several methods within your composition.

3. Outline - This is essential to producing a good argument. Your outline should be close to this:

   I - Introduction
      a. State the argument (your views)
      b. Introduce support (Hint at direction of composition)

   II - Main supporting statement
      a. details or examples to clarify

   III-VI- Other supporting arguments (you should have 5 - 6 good points to to support your views, and develop each one individually in a paragraph)

   VII - Conclusion

   It is a good idea to 'head-off' the opposition so make your support strong and logical.

   With these points in mind, outline your topic. You may use one from the suggestions below, or choose your own topic.

   a) Legalized Abortions
   b) Women's Lib
   c) Violence on Television is Harmful to Children
   d) Lets Get Americans Out of Canada
   e) I'll Always Vote for the _____?_____ Party.
   f) Education is a Privilege - not a Right.

   Pick a topic that you feel strongly about and argue either in support of or against the issue. Either way, keep the other 'side' in mind when you build your argument.

4. Write the introduction - It is essential to write a good introduction, this may determine whether any one will listen to you. Think about your audience. Now write your opening statements.

5. Following your outline, write the paper. Your final copy should be 450 - 550 words in length and double spaced on the page.

Proofread your work for spelling, punctuation, grammar, sentence structure and variety, paragraph structure and development. Carefully examine the logic and clarity of your arguments as well.

Now, do the Item Progress Check, Form 1, for this Item. If you do not make the criterion, correct and improve your composition to hand it when you are ready for Form 2.

Communications Item Progress Check

UNIT IX: WRITING COMPOSITIONS

ITEM D: ARGUMENT

FORM 1

Name: _____

Date: _____

Criterion 22/25
Score_____ /25

(5) 1. Hand in the outline for an argument that you prepared for this Learning Activities for this Item. Staple it to this sheet.

(20)2. Hand in the argument that you prepared for the Learning Activities for this Item. Staple it to this sheet also. Make sure that you proof-read it thoroughly before you hand it in.

TEACHERS COMMENTS:

Communications Item Progress Check

UNIT IV: WRITING COMPOSITIONS

ITEM D: ARGUMENT

FORM 2

Name: _____

Date: _____

Criterion 17/20 Score _____/20

Reread the composition you handed in for the Form 1 Item Progress Check. Carefully check the errors noted and suggestions made by your instructor.

Re-write the composition, again double spacing it. Correct all errors and improve the writing wherever you can.

Staple the re-written composition with the original, to this sheet and hand them in for marking.

TEACHERS COMMENTS:

DIAGNOSIS

UNIT X : CRITICAL READING

This unit is worked in much the same way as the last units of the Core Programme. You work through the learning activities for each item and do the Item Progress Check, for which you will hand in the work you did in the Item.

Carefully read the following explanation of this Unit. It applies to each Item.

There is nothing very difficult about critical reading except that it means reading thoughtfully and sometimes 'between the lines'. Instead of reading purely for enjoyment, concentrate on what the author is trying to do. More often than not, he is doing more than simply telling a story. Think about why he has written it and how he tells the story.

When you prepared a summary (Unit VII) you must have noticed that it is not always necessary to include details and examples. Why then, does an author do this? What purpose do these details serve in fictional writing? Keep these basic questions in mind as you read.

In doing your work, you will be doing a lot of reading. See your instructor when you have chosen the novel or short story you wish to use. You may use one novel for all Items (A-E) or you may use 2-3 short stories. Perhaps there is a book you have already read that you would like to analyse. Remember to ask your instructor if the book is suitable and acceptable for you to use. It is not necessary for you to use only one book; the choice of which book or books to use, is yours.

COMMUNICATIONS

UNIT X: CRITICAL READING

ITEM A: SETTING

OBJECTIVES

The student must be able to:

1. Analyse setting in a short story or novel

2. Write an essay on setting, covering the necessary points (see Learning Activities); the essay to be 500-600 words in length.

LEARNING ACTIVITIES

1. Read through the following questions about setting. Briefly answer each one in your note books. Your answer will be based on the book or short story you are going to use for this item. As you answer the questions, you may need to go back over the story to find exact answers. Make a note of the pages that you refer to for each question.

   1. Describe the setting as the story opens.

      a) Where does the story take place?
      b) When does the story take place?
      c) Is it a real place? Could it be?
      d) What does the area 'look' like?

   2. Does the setting change? Does it all happen in one place? How many days, months or years are covered? Is the weather important? Does it stay the same?

   3. Does the author describe the setting very much? Why or why not?

   4. Could another setting have been used? Explain.

   5. How does the setting affect the story? Is it important to the story?

   6. Does the setting reflect what is happening? Does the author make the setting match the action? (e.g. - a suspense story would be more suspenseful in an old, scruffy house that creaks and groans than in a new, clean, "well-oiled" house).

Try to answer all of the questions. Some of them may not apply, but you must try to answer each one. Do not try to give simple answers, they probably don't exist for all questions. If you think of any points not mentioned, add notes to cover these in your work. Don't worry about "getting the right answer". There are really no "right answers". If you think carefully about the setting, your ideas about it will probably be reasonable.

2. Organize your notes. Group together points that are related to each other and write an outline for your paper. Your outline should indicate what points you will cover in each section. Make sure you have a logical order for your ideas.

3. Write your paper. Be careful not to go off topic, and remember to include all of the pertinent ideas. When it is finished, re-read it and proofread it. Your final copy should be about 500-600 words, double spaced and free of grammatical errors. When it is complete, do the Item Progress Check.

   If you did not make the criterion of Form 1 of the Item Progress Check, make the necessary changes and corrections before doing Form 2.

Communications Item Progress Check

UNIT X : CRITICAL READING

ITEM A : SETTING

Form 1

NAME:_____

DATE:_____

Criterion 22/25
Score_____/25

Hand in the composition you wrote for this item on setting in a novel or story. Before you hand it in, proofread it carefully for errors in punctuation, capitalization, spelling, usage, sentence structure and paragraph structure. Carefully check the contents. Are your points clearly and logically stated? Did you say everything that you wanted to say about your topic?

Name of novel or story used_____

Author_____

TEACHERS COMMENTS:

COMMUNICATIONS ITEM PROGRESS CHECK

UNIT X : CRITICAL READING Name:_____

ITEM A : SETTING Date:_____

FORM 2

CRITERION 20/25
SCORE_____/25

Hand in the composition you wrote for this item. Before you re-submit your work, correct and improve it in anyway you can. Proofread it carefully and staple it to this sheet when you feel it is complete. Also hand in Form 1 of the Item Progress Check, for your teacher to compare this to.

TEACHERS COMMENTS:

COMMUNICATIONS

UNIT X : CRITICAL READING

ITEM B : PLOT

OBJECTIVE

The student must be able to:

1. Analyse plot in a short story or novel.

2. Write a critical essay on the 'plot' of a selected novel or short story. The essay must be 500-600 words in length.

LEARNING ACTIVITIES

1. Read through the following questions about plot. Briefly, answer each one in your notes. Your answers will be based on the book or short story you chose for this item. It must be approved by your instructor before you use it. You will need to use the book in preparing your answers. (It will be helpful to make a note of the pages you referred to in getting your answers).

   1. Briefly summarize the plot. Include the important and main events and details. What details should be left out? Why did the author include them?
   2. What order does the author tell the story in? Why do you think he uses this order?
   3. What effects does the author create in his plot? How does he make the action seem real? Is this a situation that could really happen?
   4. What about the ending? Why does the author end the story there? Does he leave any questions unanswered? Why?
   5. Why does the author sometimes leave out details of the action? Does he introduce new things into the action? Are there any surprises? Could you predict the outcome? What effect do these things have on your enjoyment of the story?
   6. How do the plot and setting relate to each other?

   Although these questions may seem like simple Yes or No questions, they are not. Consider the story as a whole and ask why each one of these things was or was not done with the plot.

2. Outline your paper. In point form, organize the points you have obtained from your examination of the plot.

3. Write your paper. For your final copy, double space your work. Your composition should be 500-600 words. Check it over for spelling errors, grammatical errors, sentence structure and organization.

Now, do the Item Progress Check, Form 1. If you do not make the criterion, make any corrections or improvements needed and go on to Form 2.

Communications Item Progress Check

UNIT X : CRITICAL READING

ITEM B : PLOT

Form 1

Name:_____

DATE:____ /_____

Criterion 22/25
Score _____/25

Hand in the composition you wrote for this item on plot in a novel or a story. Before you hand it in, proofread it carefully for errors in punctuation, capitalization, spelling, usage, sentence structure and paragraph structure. Carefully check the contents. Are your points clearly and logically stated? Did you say everything that you wanted to say about your topic?

Name of novel or story used_____

Author_____

TEACHERS COMMENTS:

COMMUNICATIONS ITEM PROGRESS CHECK

UNIT X : CRITICAL READING

NAME: _____

ITEM B : PLOT

DATE: _____

FORM 2

CRITERION 20/25
SCORE _____/25

Hand in the composition you wrote for this item. Before you re-submit your work, correct and improve it in anyway you can. Proofread it carefully and staple it to this sheet when you feel it is complete. Also hand in Form 1 of the Item Progress Check, for your teacher to compare this to.

TEACHERS COMMENTS:

UNIT X : CRITICAL READING

ITEM C : CHARACTERS

OBJECTIVES

The student must be able to:

1. Analyze character and its importance in a novel or short story.
2. Write a 500-600 word composition about character(s) in a selected novel or short story.

LEARNING ACTIVITIES

Work this item in the same way you did the previous two for this unit. Read through the questions given and make notes on them, with specific reference to the novel or story you are working on. You may choose to examine the central character, but he is usually affected by other characters in the story, so you will have to consider them too.

1. What does the character look like? Are you given a detailed description? Why or why not? Does the author use any special techniques to describe the person? How does this help us to understand the character?

2. What is the character's background? How much are you told about him? How does this affect your view of the character? Should you have been given more information?

3. Does the character seem realistic? Is he a stereo type? (Stereo types are the "typical" girl next door; all-American boy; they are not usually so real) Do you agree with the way the character acts, thinks or feels? How should he behave?

4. What can you tell about the character from the other characters? How does he speak to them or react to them? How do they relate to him?

5. What are his strengths and weaknesses? Try to get "inside" the character. Why does he behave the way he does? How does he really feel?

6. Does the character change at all as the story progresses? In what ways does he change? Does he mature an/or learn from his experiences?

Now, outline your paper and write it. Your final copy will need to be free of any errors and clearly express your points. Double space it and write it out neatly.

Do the Item Progress Check, Form 1. If you do not make the criterion, revise your work before doing Form 2.

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Communications Item Progress Check

UNIT X : CRITICAL READING Name;_____

ITEM C : CHARACTER Date:_____

Form 1

Criterion 22/25
Score_____/25

Hand in the composition you wrote for this item on character in a novel or a story. Before you hand it in, proofread it carefully for errors in punctuation, capitalization, spelling, usage, sentence structure and paragraph structure. Carefully check the contents. Are your points clearly and logically stated? Did you say everything that you wanted to say about your topic?

Name of novel or story used_____

Author_____

TEACHERS COMMENTS:

COMMUNICATIONS ITEM PROGRESS CHECK

UNIT X : CRITICAL READING NAME:_____

ITEM C : CHARACTERS DATE:_____

FORM 2

CRITERION 20/25
SCORE_____/25

Hand in the composition you wrote for this item. Before you re-submit your work, correct and imporve it in anyway you can. Proofread it carefully and staple it to this sheet when you feel it is complete. Also hand in Form 1 of the Item Progress Check, for your teacher to compare this to.

TEACHERS COMMENTS:

COMMUNICATIONS

UNIT X : CRITICAL READING

ITEM D : CONFLICT

OBJECTIVES

1. Analyse conflict in a novel or short story
2. Write a 250 - 350 word composition about conflict in a novel or short story

LEARNING ACTIVITIES

This item will be done in the same way as you did the previous items in this unit. Read and answer the questions. Outline your paper and write it. Make your final copy carefully (double-spaced) and check it over for errors.

Conflict is a central element in most novels or short stories. Without it, there would be no story. It might be conflict between one character and another or between one character and himself. It may be conflict between man and nature - as in a tale of survival in the jungle. There are many more possibilities, and there are many combinations of these, even within a story.

Answer these questions:

1. What is the main conflict in this story?
2. What other conflicts exist?
3. How is the conflict resolved? If it is not resolved; why not?
4. What does the conflict represent in general terms? (For example man against man; man against himself; man against nature; these are expressed in more general terms).
5. What is the author trying to get across about conflict? What is he saying in general terms?

Think carefully before you write your essay. When it is completed, do Item D Progress Check Form 1. If you do not make the criterion, re-do the writing, correcting and improving it where possible, before doing Form 2.

Communications Item Progress Check

UNIT X : CRITICAL READING

ITEM D : CONFLICT

Form 1

Name:_____

Date:_____

Criterion 22/25

Score_____/25

Hand in the composition you wrote for this item on conflict in a novel or story. Before you hand it in, proofread it carefully for errors in punctuation, capitalization, spelling, usage, sentence structure and paragrph structure. Carefully check the contents. Are your points clearly and logically stated? Did you say everything that you wanted to say about your topic?

Name of novel or story used_____

Author_____

TEACHERS COMMENTS:

COMMUNICATIONS ITEM PROGRESS CHECK

UNIT X: CRITICAL READING

ITEM D: CONFLICT

FORM 2

NAME:_____

DATE:_____

CRITERION 20/25
SCORE_____/25

Hand in the composition you wrote for this item. Before you re-submit your work, correct and improve it in anyway you can. Proofread it carefully and staple it to this sheet when you feel it is complete. Also hand in Form 1 of the Item Progress Check, for your teacher to compare this to.

TEACHERS COMMENTS:

UNIT X: CRITICAL READING

ITEM E: THEMES

OBJECTIVES

1. Identify and analyse the theme in a novel or short story
2. Write a composition (600-700 words) about theme in a selected novel or short story.

LEARNING ACTIVITIES

Work this item in the same way as the previous items in this unit.

The theme of a novel is the author's overall statement, usually rather philosophical in nature. This usually is developed in characters and conflict, as well as plot and setting. Consider for example, the typical Western. Overall themes usually indicate that "justice will triumph", "man can overcome the odds if he sticks to his beliefs" or that, "the right man always comes out ahead". These are basic themes that are developed in the plot and through the characters.

Answer these questions:

1. What is the central theme? How does the author develop it? What other themes are included? You must be able to justify your ideas by referring to the other elements of the story.
2. How important is the theme?
3. Where, in the story, does the theme first become noticeable? Is it introduced early or late? Trace the development of the theme.
4. How is the theme developed in the setting? the plot? the characters? the conflict?
5. Do you agree with the author's general statement? What are your views on it?
6. If other themes are evident, how do they fit in?

Think carefully before answering these questions. Outline your paper and write it. Remember to proofread your final copy carefully and double space it.

When it is written, do Item E Progress Check, Form 1.

Communications Item Progress Check

UNIT X : CRITICAL READING

Name:_____

ITEM E : THEMES

Date:_____

Form 1

Criterion 22/25
Score_____/25

Hand in the composition you wrote for this item on themes in a novel or story. Before you hand it in, proofread it carefully for errors in punctuation, capitalization, spelling, usage, sentence structure and paragraph structure. Carefully check the contents. Are your points clearly and logically stated? Did you say everything that you wnated to say about your topic?

Name of novel or story used_____

Author_____

TEACHERS COMMENTS:

COMMUNICATIONS ITEM PROGRESS CHECK X

UNIT X : CRITICAL READING NAME:_____

ITEM E : THEMES DATE:_____

FORM 2

CRITERION 20/25
SCORE_____/25

Hand in the composition you wrote for this item. Before you re-submit your work, correct and improve it in anyway you can. Proofread it carefully and staple it to this sheet when you feel it is complete. Also hand in Form 1 of the Item Progress Check, for your teacher to compare this to.

TEACHERS COMMENTS:

COMMUNICATIONS DIAGNOSIS

UNIT XI: TECHNICAL REPORTS

There is no written diagnosis for this Unit. Instead you will work through each Item and write the Item Progress Check.

Begin this Unit by getting the Learning Activities sheet for item A. Read the Objectives, note the Learning Resources, and work your way through the assignments.

When you have completed the work outlined, re-examine the Objectives and assess your progress. If you are sure you have mastered the Objectives, you can write Form 1 of the Item Progress Check. If you do not feel prepared for the Progress Check, continue work on your assignment until you are satisfied.

Once the Check is written, you do one of two things. If you were prepared for the Check, you made the criterion; go on to Item B, get the Learning Activities sheet and proceed as before. If you did not make the criterion, re-do your work as directed. Then, write Form 2 of the Item Progress Check.

When you have read this Diagnosis sheet, make a note of the studies required on your weekly planning sheet, and return this diagnosis sheet to the files.

COMMUNICATIONS

UNIT XI: TECHNICAL REPORT

ITEM A : MAKING NOTES

OBJECTIVES

The student must be able to:

1. Make notes from a written presentation, including the main ideas and points that are important.
2. Make notes from an oral presentation, including the main points.

LEARNING RESOURCES

Basic Reading Skills

Work-a-text English 1

LEARNING ACTIVITIES

1. Re-examine the Learning Activites for Item B of Unit VII. In that unit, you outlined some specific topics. That kind of outline is similar to making notes except that note making is more selective. To do an outline, you consider all of the points mentioned but in making notes, you will only outline those parts of the material that are relevent to your assignment.

   For example, if you had to write a report about using a new type of engine in a sewing machine, you might make notes on the other types of engines that had been used, in sewing machines, but you would probably omit notes on types of engines used in lawn mowers. Stick to your topic.

2. Read and do the exercise on pages 140-142 of Basic Reading Skills.

3. Read and do the exercises on page 115 of English Work-a-text 1.

4. (Pages 52-53, Better Work Habits) Now, practice making notes from your reading. Choose a topic and find at least three sources of information. Make notes from each source about your topic. Here are some suggestions:

   The Space Program - what it costs
   The Structure of a Cell
   Symptoms of Drug Addiction

   You may choose your own topic, but remember, a report is a factual as possible and uses good sources of information. Use at least three

sources and make sure that you label your notes from each source. Make sure, also, that your souces are available to your instructor. (Bring in books or articles you use.)

5. Sometimes, you can add to your report from either an interview or an oral presentation. There may be a good television program you can get information from. Listen carefully and jot down the pertinent points.

(Better Work Habits, pages 162-163)

6. Practice making notes from an oral presentation. Here are some suggested ways:

If there is to be a speaker coming into the class, or a Science Group report, arrange with your instructor to make notes on the presentation.

You could also choose to make notes on one of the tapes you have heard (probably with a filmstrip) in Science or Math.

Find a radio presentation to listen to. Arrange ahead of time with your instructor to listen to some form of report. This will enable the insturctor to mark your work.

Now do Item Progress Check, Form 1, for this Item. You will hand in the notes you made for your work on these Learning Activities. If you do not make the criterion, re-do the exercises, changing your topics. Get your instructor to look at your work as you do it, to help you. Then, do Form 2, for which you will hand in your new assignments.

COMMUNICATIONS ITEM PROGRESS CHECK

UNIT XI: TECHNICAL REPORTS NAME: _____

ITEM A : MAKING NOTES DATE: _____

FORM 1

CRITERION 15/17
SCORE _____/17

Hand in the assignments that you did for this item. Staple them to this sheet.

TEACHERS COMMENTS:

COMMUNICATIONS ITEM PROGRESS CHECK

UNIT XI: TECHNICAL REPORTS NAME:_____

DATE:_____

ITEM A : MAKING NOTES

FORM 2

CRITERION	13/17
SCORE	_____/17

Hand in the assignments you did for the Learning Activities. There is one set of notes made from three book references and one set of notes from something you listened to.

TEACHERS COMMENTS:

1075

UNIT XI: TECHNICAL REPORTS

ITEM B : CHARTS AND DIAGRAMS

OBJECTIVES

The student must be able to:

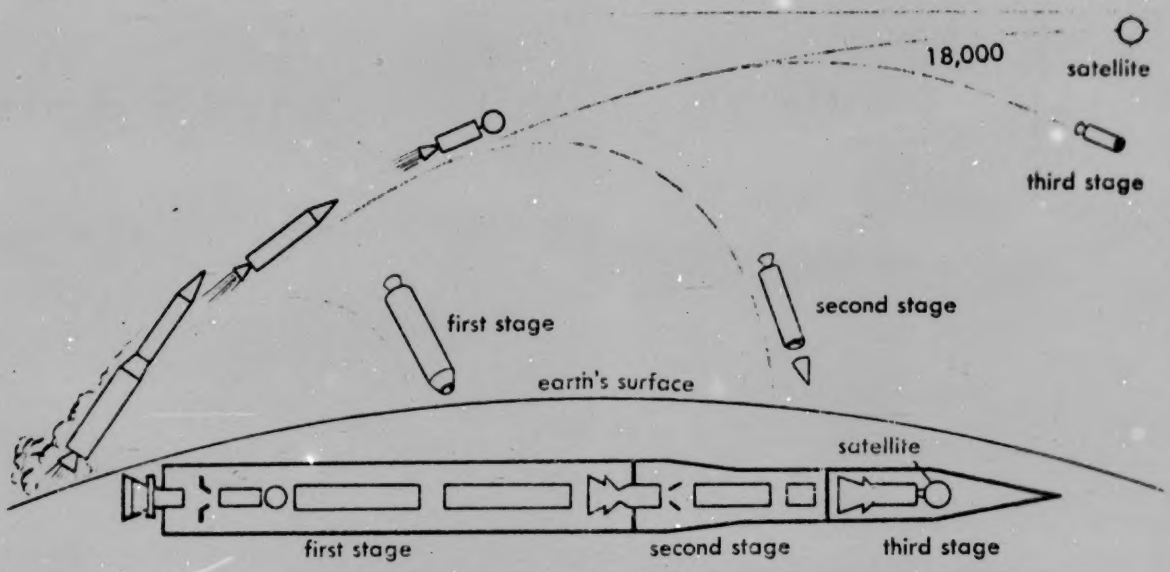
1. Briefly explain and describe the information contained in a given chart or diagram.

2. Make a chart or diagram, given a written explantion or 'project' idea.

LEARNING ACTIVITIES

1. Charts and Diagrams can be anything from complicated technical drawings (that only the designer can fully interpret to the simple graphs and maps we use in everyday life. Your Math Course (See Unit IX) contains some graphs. Your Science texts are full of diagrams and charts. (See Healthful Eating, Physical Science, etc.) In Unit VII of the Communications program, you looked at some simple charts. Review Item A of Unit VII before doing this work. Re-do the exercises if necessary.

2. Now, look at the following and do the work as directed.



Write a brief explanation of this diagram. Approximately how long in terms of total length, is each stage? What finally happens to the rocket? Where did the satellite come from?

b)

NORTH

This is a floor plan, for a house. You are to write a brief explanation of it, giving total area of the house, approximate room locations and room sizes.

Make a chart for the explantion. Give size of each room, (dimension and floor space) number of windows, and which direction each faces.

Now do the Item Progress Check, Form 1. If you did not make the criterion, re-do the work, then go on to do Form 2.

COMMUNICATIONS ITEM PROGRESS CHECK

UNIT XI : TECHNICAL REPORTS NAME: _____

ITEM B : CHARTS AND DIAGRAMS DATE: _____

FORM 1

CRITERION 15/17 SCORE _____/17

Hand in the assignments that you did for this item. Staple thme to this sheet.

TEACHERS COMMENTS:

COMMUNICATIONS ITEM PROGRESS CHECK

UNIT XI: TECHNICAL REPORTS NAME: _____

ITEM B : CHARTS AND DIAGRAMS DATE: _____

FORM 2

CRITERION	13/17
SCORE	17

Hand in the assignments you have corrected and improved; these are the same ones you handed in for Form 1 of this check.

TEACHERS COMMENTS:

COMMUNICATIONS

UNIT XI: TECHNICAL READING

ITEM C : OUTLINING

OBJECTIVES

The student must be able to:

1. Gather and sort information for a technical report of 350-450 words
2. Outline a technical report, using the information to be included in the report.

LEARNING ACTIVITIES

Almost wit out exception, business and technical reports in particular are written and presented to inform the reader on a matter in which he has a special interest. The subject of the report may be a statement to the stockholders, a market survey for the sales manager, a series of chemical test for the general manager, an investigation of an accident for the plant superintendent, or a two-year research project for the president. Whatever the subject of the report or whatever the form of it, consideration for the reader or readers is of supreme importance. The reader must be able to understand the report, and it must meet his needs.

1. Choose your topic:

   Select a topic that is, if possible, related to an employment field you are interested in or a hobby you pursue.
   For example: An instrument or simple machine used in the work. (Typewriter, carpenters lathe, tape recorder.) A process involved in the job. (Office procedures, preparing materials for work).

   Select your topic, and examine such things as history, methods of operating the machine, possible problems. It is best to choose a topic you are not unfamiliar with. Have your instructor approve your topic.

2. Make notes, using any resources available; make sure you label your notes as to source.

3. Organize your notes and prepare an outline. Examine these sample outlines:

   SELECTION OF A TRUCK

   for

   SUBURBAN DELIVERY

   Limiting Sentence: The unit construction of the A.B. Delivery Truck will give us the sturdy construction needed for steady service to

suburban customers, and the ease of handling to enable us to keep our routemen satisfied.

Outline:

I. Introduction

II. Unit construction

III. Chassis

- A. Engine
- B. Frame
- C. Spring suspension
- D. Transmission

IV. Body

- A. Construction
- B. Equipment
- C. Exits
- D. Driver's cab

V. Performance

- A. Economy
- B. Cruising speed
- C. Rate of pickup
- D. Ease of handling

IV. Conclusion

TRAINING CALCULATING MACHINE OPERATORS

A. Introduction

B. Selecting applicants

- I. Testing
  - a. Education
  - b. Aptitude
- II. Orienting

C. Determining scope of training

- I. Machine operation
- II. Related sutdies
  - a. General arithmetic
  - b. Specific company figuring

D. Selecting training means

- I. Public schools
- II. Commercial schools
- III. Manufacturer-run schools
- IV. Company training on the job

E. Conclusion

Notice the format used. It is immediately clear to the reader, just what will be contained in the report. It is also easy to see what other areas might be included. Both samples show the important issues to be covered in the report and you can also begin to see the 'shape' of the report.

Your assignment is to prepare an outline like those given in the samples. When you have prepared your outline, do Form 1 of the Item Progress Check.

If you do not make the criterion, re-do your outline (gather nore information first, if necessary) and correct or improve it where possible. Then do Form 2 of the Item Progress Check

COMMUNICATIONS ITEM PROGRESS CHECK

UNIT XI: TECHNICAL REPORTS

ITEM C : OUTLINING THE REPORT

FORM 1

NAME:_____

DATE:_____

CRITERION 9/10
SCORE_____10

Hand in the finished outline that you prepared for this Item. Check it over carefully before stapling it to this sheet to hand in.

Topic_____

TEACHERS COMMENTS:

1083

COMMUNICATIONS ITEM PROGRESS CHECK

UNIT XI: TECHNICAL REPORTS

ITEM C : OUTLINING THE REPORT

FORM 1

NAME: _____

DATE: _____

CRITERION	8/10
SCORE	____/10

Re-submit your outline for this Item Check. You should have corrected your errors and improved your work in any way possible. Also hand in your original work and Form 1 of this Item Check.

TEACHERS COMMENTS:

1084

COMMUNICATIONS

UNIT XI : TECHNICAL REPORTS

ITEM D : WRITING THE REPORT

OBJECTIVES

The student must be able to:

1. Write a technical report of 350-450 words, on ta topic approved by the instructor.

LEARNING ACTIVITIES

1. Use your outline and your notes (complete with charts and diagrams, if any) to put together your report. This is usually quite simple if you have a good outline.

2. When you have done your rough draft, check for these points:
   1. Have I used forward refernces between paragraphs where needed in the long sections?
   2. Does the body of the report follow the outline?
   3. Does the body of the report fulfill the promises and carry out the plan announced in the introduction?
   4. Do I know the point in each paragraph at which the topic idea is expressed?
   5. Do all the unit paragraphs have one and only one topic sentence?
   6. Have I made my paragraphs short enough to give the reader needed pauses and resting periods?
   7. Is the topic idea in a prominent enought spot to let the reader know that it is the topic of the paragraph?
   8. Having captured the reader's attention in each paragraph, have I held it?
      a) through the logical arrangement of my ideas?
      b) through tying related sentences together with link words?
   9. Have I varied my transitional (link) words and phrases so that the reader may go from paragrph to paragraph with ease?
   10. Are my facts straight?
   11. Are all details clearly expressed or are these parts that confuse the reader?
   12. Are all charts and diagrams completely labelled?

3. Proofread your report.

4. Rewrite the report, double spacing it.

Now do Form 1, of the Item Progress Check, if you do not make the criterion, re-do your report, correcting and improving it where possible, before doing Form 2.

1C86

COMMUNICATION ITEM PROGRESS CHECK

UNIT XI: TECHNICAL REPORTS

ITEM D : WRITING THE REPORT
FORM 1

NAME:_____

DATE:_____

CRITERION 13/15
SCORE _____/15

Hand in the finished report that you prepared for this Item. Check it over carefully before stapling it to this sheet to hand in.

Topic_____

TEACHERS COMMENTS:

1087

ITEM PROGRESS CHECK

UNIT XI: TECHNICAL REPORTS

ITEM D: WRITING THE REPORT

FORM 2

NAME: _____

DATE: _____

CRITERION 12/15
SCORE _____/15

Re-submit your report for this Item Check. You should have corrected your errors and improved your work in any way possible. Also hand in your original work and Form 1 of this Item Check.

VAST Science Program

CORE

Unit I: Foundations of Science
- Item A: Methods of Science

Unit II: Human Biology
- Item A: Living Matter
- Item B: Body Systems

Unit III: Health
- Item A: Foods and Nutrition
- Item B: Disease Prevention

Unit IV: Safety and First Aid
- Item A: Accident Prevention
- Item B: First Aid

Unit V: Drugs and Society
- Item A: Drug Problems

Unit VI: Ecology
- Item A: The Earth and Life
- Item B: Man and his Environment

Unit VII: Physical Sciences
- Item A: Chemistry
- Item B: Physics

Unit VIII: Heat, Light and Sound
- Item A: Heat
- Item B: Light
- Item C: Sound

OPTIONS

Unit IX: Chemistry
- Item A: Properties of Matter
- Item B: Elements and Compounds
- Item C: Chemical Reactions

Unit X: Mechanics
- Item A: Force and Work
- Item B: Simple Machines
- Item C: Energy
- Item D: Motion

Unit XI: Gases
- Item A: Properties of Gases
- Item B: Oxygen and Hydrogen

Unit XII: Water and Hydraulics
- Item A: Water
- Item B: Hydraulics

Unit XIII: Heat
- Item A: Heat and Temperature
- Item B: The Effects of Heat
- Item C: Heat Transfer

Unit XIV: Electricity
- Item A: Magnetism
- Item B: Static Electricity
- Item C: Current Electricity

OE003 369

UNIT I: Foundations of Science

ITEM A: Methods of Science

OBJECTIVES

The student must be able to:

1. State the steps of the scientific method, and apply them to solving a problem.
2. Identify the characteristics of a person with a scientific attitude.
3. Identify some scientists and their contributions to the advancement of knowledge.
4. Identify some branches of the natural and social sciences with their areas of study.

LEARNING RESOURCES

Books: Science, A Way of Knowing, American Book Co.

Life Science, Cambridge Work-A-Text

Sound Filmstrips: Evolution: Theories Past and Present

Evolution: Abiogenesis vs. Biogenesis

LEARNING ACTIVITIES

Since this is your first assignment, we will briefly discuss how you will do science in this program. Try to study science as a member of a small group, organized by yourself and your instructor. Science is one of those things that can be studied more easily and effectively in groups. However, a group functions only as well as its individual members; so you must ask questions, supply answers, express opinions, and help others if you are to receive the benefits of working together.

Since there are no answers provided to most of the questions, you must discuss these with the others in your group to arrive at what would be the correct answer.
If the group still has trouble with some question, ask the instructor for help.

Try to keep together with the others in your group--plan and decide how much work the group should do each week, and set a time to work together each day. If you should fall behind the others due to illness, the responsibility to catch up is yours. They should not have to wait for you, although they will help you as much as possible. Measure your progress by what you accomplish, not by the time put in. You should complete a minimum of one Item per week in science. If you plan for this, and work effectively, you will accomplish it without too much difficulty.

You start your first science unit by doing an experiment. Select the materials you will use, try the experiment, observe what happens, and try to find out why. Select more than one experiment if you wish.

Experiments as an Introduction to the Scientific Method

1. Tea Bag

   Apparatus: 2 tea bags, 2 containers, water, heat supply.
   Method: Put one tea bag in each container. Add hot water to one and cold water to the other.
   Observations: What happens in each container?
   Conclusions: Why?

2. Floating Needle

   Apparatus: needle, container of water, absorbent paper (paper towels work well).
   Method: Place paper on the surface of the water.
   Place the needle in the paper.
   Depress the paper gently until it sinks.
   Observations: What happens to the needle?
   Conclusions: Why?

3. The experiment on page 17 in the book Science, A Way of Knowing.

There are two books and two sound-filmstrips provided for learning resources for this Item.

(1) Read Science, A Way of Knowing from page 1 through to page 37. Be sure to examine the diagrams and photographs. Then re-read pages 1 to 10 and do Review questions 2, 3, 4, 5, 6 and 9 on page 10. Re-read pages 10 to 16 and do Review questions 2, 3, 5 and 6 on page 16. Then re-read pages 17 to 26 and do Review questions 1, 2, 3, 4 and 5 on page 26. Answer these in your notebooks.

(2) Read pages vii - ix in the Introduction of Life Science and answer the questions on those pages. Check your answers with the separate answer key. Do the completion questions on page xiii and check your answers.

(3) Your science group should now set up and look at the two sound filmstrips provided for this Item. Kepp your objectives in mind as you watch the films. Discuss each one as you complete it--if you wish, have another look at them, to be sure you understand what is being said.

(4) Writing assignment: Write a paragraph of at least five or six sentences on the contributions of a major scientist like Louis Pasteur. Use good English, and check your capitals and punctuation. Have this assignment ready to hand in with your Unit Progress Test. It will count for about 25% of your mark for this Unit.

When you have completed this, reconsider the objectives of this Item. For the first objective, can you name the steps of the Scientific Method? Could you apply them to finding out what is wrong with a car that won't start? For the second objective, think of what such a person is like; what sorts of things would he or she do? For the third objective, you might make a list of those scientists you read about, and saw in the films, and after each one, state what he or she is best known for. For the fourth objective, list such sciences as Physics, Oceanography and Geology--all of which are mentioned in your reading, and note what fields of study each includes. Discuss all of the above with the other members of your group.

Now the group should be ready for the Unit Progress Test. Be sure you have your Writing assignment ready to hand in with your completed test. The test is to be done on an individual basis, but with every member of a group writing it at the same time.

Good Luck.

Science Test

UNIT I

NAME _____

DATE _____

Test Score	___ out of 30
Paragraph	___ out of 10
Total Score	___ /40

Exercise 1: Matching. Match the phrases in the right-hand column with the words in the left-hand column, by placing the letter of the phrase in the space beside the word which best matches the phrase.

(15)

____	experiment	a. information gained through the senses.
____	biology	b. factor allowed to change during an experiment.
____	conclusion	c. an "educated guess" as to a possible solution to a problem.
____	control	d. the study of the relationship between living things and their surroundings.
____	physics	e. a measurement system used in science.
____	metric	f. the study of the nature of matter.
____	chemistry	g. reasoning based on the results of an experiment.
____	variable	h. the study of plants and animals
____	evolution	i. an organized approach to solving problems.
____	hypothesis	j. a process of gradual development
____	ecology	k. the study of behavior
____	problem	l. trial or test to solve a problem.
____	psychology	m. the study of the physical sciences.
____	observation	n. a factor that does not change during an experiment.
____	scientific method	o. a question for which you are trying to find the answer.

Exercise 2: From this list, circle four words which describe the characteristics of a person with a scientific attitude.

(4)

methodical	superstituous
curious	unsystematic
timid	logical
cooperative	

Exercise 3: Here is a list of scientists who have made notable contributions to the welfare of mankind. In a sentence or two, describe what each is best known for.

William Harvey _____

_____

Louis Pasteur _____

_____

Alexander Fleming _____

_____

Charles Darwin _____

_____

Gregor Mendel _____

_____

Exercise 4: Answer this question on the back of the sheet of paper on which your paragraph is written.

(6)

Suppose you arrive home after classes to-day, and your daughter (or sister, or mother...) greets you with the news... "The oven in the kitchen stove isn't working!".

Outline briefly how you would apply the scientific method to solve the problem of finding out why the oven isn't operating. Remember, you are not being asked to fix the oven, but to apply the scientific method of problem solving to reach a logical conclusion as to why the oven won't work. Describe how you would do this.

UNIT II: Human Biology

ITEM A: Living Matter

OBJECTIVES

The student must be able to:

1. Identify the properties of a living thing as being capable of metabolism, movement, irritability, growth, reproduction, and adaptation.
2. Identify the cell as the basic unit of all living things and outline the basic parts of a typical cell.
3. Identify tissues as being formed from cells, and describe several types of tissues.
4. Identify organs as being formed from tissues and cells.
5. Identify systems as being formed from groups of organs.

LEARNING RESOURCES

Books: Science, Pomeroy

The Cell, Basis of Life, American Book Co.

Sound Filmstrip: Evolution: Theories Past and Present

LEARNING ACTIVITIES

The two Items in this Unit are concerned with human biology--how the human body is structured (Anatomy), and how it operates (Physiology). We will begin our study however, by examining the nature of life itself. What is life? Precisely how does a living thing differ from something that is non-living? Where does life come from? To find out more about these questions, and how Man has attempted to deal with the mystery of life, do the following:

(1) Read pages 45 to 52 in The Cell, Basis of Life. When this is completed, read pages 209 to 221 in Science, and complete the review questions on page 222. Check your answers with those in the back of the book.

Stop and reconsider your objectives. You will realize that your reading contains much more information than required by the objectives. While this background information is necessary for understanding, do not try to memorize it. Stick to the objectives. With this in mind, go on to the following:

(2) Read carefully pages 1 to 8 in The Cell, Basis of Life and copy the diagram of the animal cell on the top of page 7 into your notes.

(3) Writing Assignment: Write a paragraph of about half a page on one of the following topics:

(a) The Cell Theory
(b) The Process of Natural Selection (look at the sound filmstrip: Evolution: Theories Past and Present)

You can research your topic (that is, find information about it) in the readings outlined above. As you write, be sure all words are spelled correctly. Check also for capitals and punctuation errors. Have this paragraph ready to hand in with your Unit II Science Test.

This completes your work in Item A. If you have any questions or difficulties which your group cannot resolve, get help from your instructor. Then proceed to work on Item B.

UNIT II: Human Biology

ITEM B: Body Systems

OBJECTIVES

The student must be able to:

1. Identify the relationship between tissues, organs and systems.
2. Describe the basic structure and primary functions of:
   a. the skeletal system
   b. the muscular system
   c. the respiratory system
   d. the digestive system
   e. the circulatory system
   f. the excretory system
   g. the nervous system
   h. the endocrine system
   i. the sense organs

LEARNING RESOURCES

Books: Science, Pomeroy
The Human Organism, American Book Co.
Life Science, Cambridge Work - A - Text

Filmstrips: Human Physiology Series, SVE-Singer

Local Resources: Doctor or Health Nurse

LEARNING ACTIVITIES

This Item deals with the various systems of the human body. In your reading you will find much more detail than you are required to learn. Your objectives state that you are to learn only basic structure and primary functions--that is, you are to omit details. However, many details are included in your reading--these help to make the basic ideas more easily understood--so you are to read and understand the details, but not commit them to memory. With this in mind, let us begin...

Using the book The Human Organism do the following:

a) Study pages 3 to 9; copy and do Review questions 1 to 5 on page 9. Then set up the projector and look at the filmstrip Human Body Framework. Since these are silent filmstrips, you will have to advance the film manually.

b) Study pages 9 to 12; copy and do Review questions 1 to 5 on page 12. Then view the filmstrip Human Body Framework to show the muscular system.

c) Study pages 33 to 38; copy and do Review questions 1 to 5 on page 38. Then view the filmstrip Human Respiratory System.

d) Study pages 38 to 43; copy and do Review questions 1 to 4 on page 43. Then view the filmstrip Human Digestive System.

e) Study pages 43 to 49, copy and do Review questions 1 to 4 on page 49. Then view the filmstrip Human Circulatory System.

f) Study pages 49 to 50; copy and do Review questions 1 to 5 on page 51.

g) Study pages 54 to 57; copy and do Review questions 1 to 6 on page 57. Then view the filmstrip Human Nervous System.

h) Study pages 61 and 62; copy and do Review questions 1 to 4 on page 62. Then study pages 65 to 68; copy and do Review questions 1 to 6 on page 69. Then view the filmstrip Human Glandular System.

i) Study pages 58 to 60; copy and do Review questions 1 to 6 on page 60. Then view the filmstrip Human Sense Organs.

The above assignments represent a lot of work, and you probably will not be able to complete this Item in one week. However, you may have finished Item A of this Unit in less than a week, so the total time for this Unit should still not exceed two weeks!

For some extra review, or more extensive (and interesting) reading on the preceeding topics, read Unit 5 (pages 247 to 291) in the book Science, by Pomeroy. This little book, with its varied presentation gives up-to-date information on human biology. Life Science is also useful.

Arrange for your instructor to meet with your group to clear up any difficulties, to check some of your answers, and to go over the objectives for this Item. In addition, review your work for Item A. Have your Unit II - Writing Assignment ready, and then your group can arrange to write the Unit II Science Test.

Science Test

UNIT II

NAME: _____

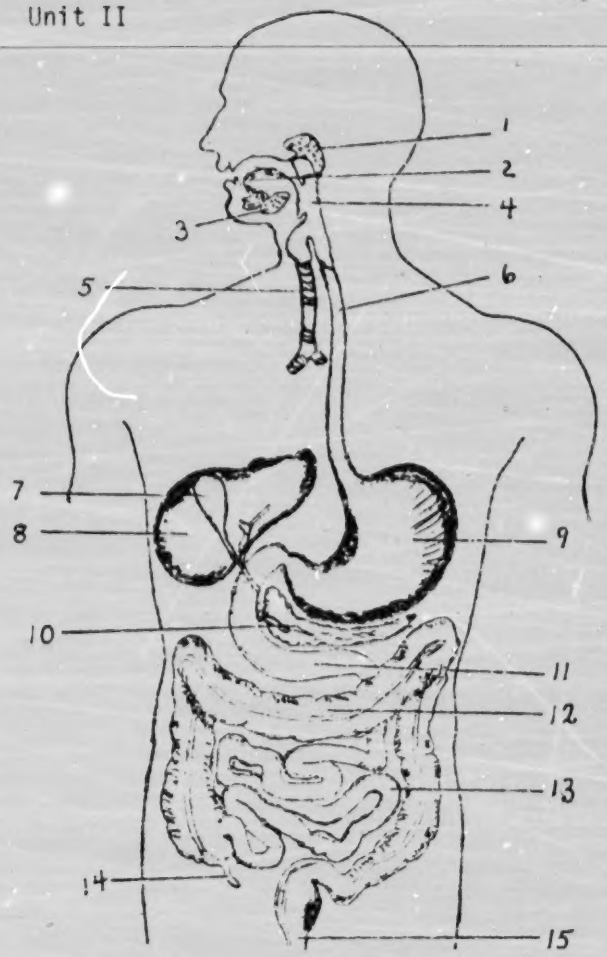
DATE: _____

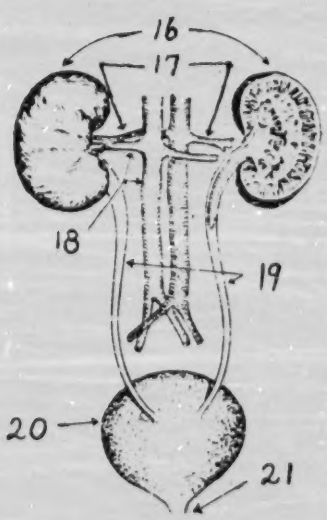
Test Score	___ out of 54
Paragraph	___ out of 10
Total Score	___ /64

Exercise 1: Underline the word or phrase inside the parenthesis, which is most closely related to the word on the left.

(20)

1.	Cell	(living, non-living)
2.	Spinal Cord	(muscle, nerve)
3.	Organ	(nerve, lung)
4.	Stomach	(system, organ)
5.	Regeneration	(non-living, living)
6.	Function	(parts, activities)
7.	Cell	(smallest organized unit, largest organized unit)
8.	living	(erosion, reproduction)
9.	Hemoglobin	(white blood cell, red blood cell)
10.	Capillaries	(bloodvessels, nerves)
11.	System	(group of organs, group of tissues)
12.	Living	(metabolism, evaporation)
13.	Organ	(group of tissues, group of cells)
14.	Structure	(parts, activities)
15.	Sperm	(overies, testes)
16.	Tissue	(nerve, digestive)
17.	System	(circulatory, heart)
18.	Biceps	(muscle, joint)
19.	Optic Nerve	(ear, eye)
20.	Cerebrum	(brain, abdomen)





Exercise 2: Answer each question in the space provided. (12) The numerals in the questions refer to the numbered parts in the diagram.

What digestive juice is secreted by parts 1 and 3? _____

Part 5 is a tube leading to - _____

Name the following parts:

8 _____

9 _____

10 _____

12 _____

13 _____

What secretion is produced by part 7? _____

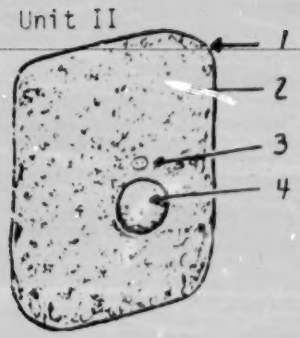
What is the name of the part numbered 14? _____

Give the numbers which indicate each of these organs.

bladder ____

urethra ____

kidneys ____

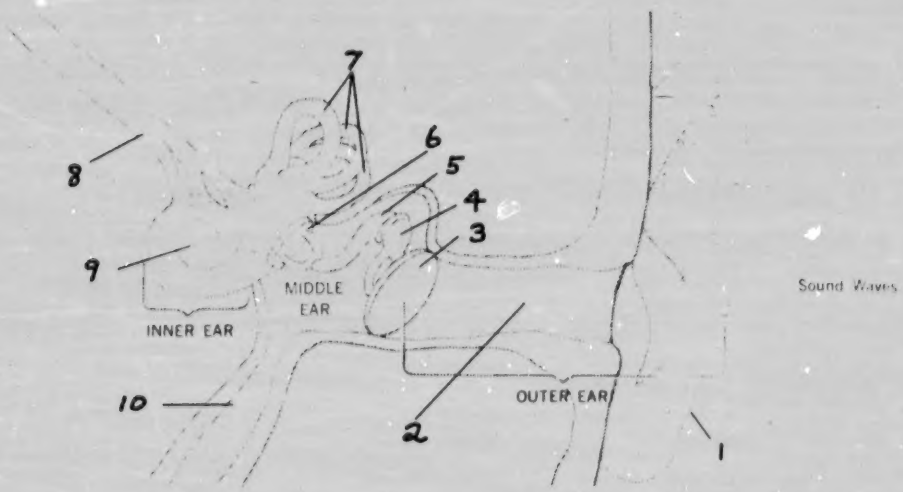


Exercise 3: (22) Answer each question in the space provided. The numerals in the questions refer to the numbered parts of the diagram. Thjs diagram represents a typical animal cell.

Which numbers represent a:

cell membrane _____

cell nucleus _____



What numbers represent:

ear drum _____

hammer _____

anvil _____

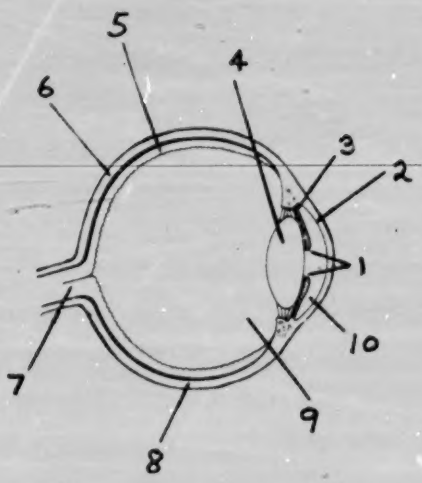
stirrup _____

What is the function of number 7? _____

_____

What is the function of number 8? _____

_____

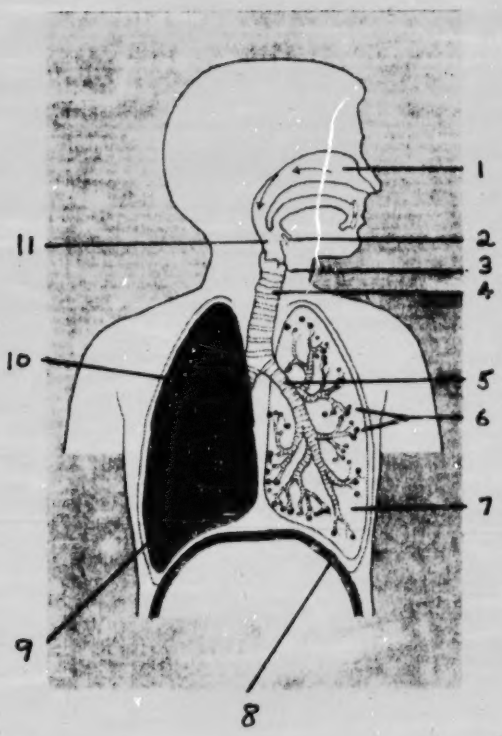


What numbers represent:

lens _____

iris _____

optic nerve _____



What numbers represent:

nasal passage _____

diaphragm _____

What is the function of number 6? _____

_____

List 3 functions of the skeletal system:

a) _____

b) _____

c) _____

Why is circulation of the blood necessary to the life of the cell?

_____

_____

_____

What is the difference between an artery and a vein? _____

_____

Name the 3 main parts of the nervous system: _____

_____

_____

UNIT III: Health

ITEM A: Foods and Nutrition

OBJECTIVES

The student must be able to:

1. State the reasons for the importance of a good diet.
2. Identify the role in good nutrition of-

   carbohydrates
   proteins
   minerals
   vitamins
   fats

3. Prepare a nutritionally balanced food list.
4. Locate and use sources of consumer information.

LEARNING RESOURCES

Booklets: Healthful Eating, Canada Dep't of Health and Welfare

The Supermarket Storybook, Rush
What to Eat to be Healthy, Canadian Life Insurance Assn.

Book: Science, Pomeroy

Local Resources: Public Health centre in your community
Home Economics Division of B.C. Hydro
Canada Department of Health and Welfare
Newspaper

LEARNING ACTIVITIES

Read pages 5 to 13 in the booklet, Healthful Eating. Note especially "Canada's Food Guide" on page 5. On the pages following you will find accurate descriptions of everyday terms used to describe the food we eat, such as "condensed milk" and "enriched bread", and so on.

(1) What is "Canada's Food Guide"? Copy it into your notebook.

Read pages 14 to 24 on "Food for the Family" and "Menu Planning". Note how different members of a family should have different diets to meet their special needs.

(2) Make brief notes under the headings of Special Diet Requirements:

The Infant
The Pre-schooler
The School Child
The Teen-ager
The Adult
The Older Person

Food Budgeting: Read carefully pages 25 to 29 in Healthful Eating. Here are many suggestions regarding planning a diet and buying food supplies. Note the charts carefully. Also read the booklet What to Eat to be Healthy.

(3) Plan a diet for a family of four for one week (2 parents, 1 teenager, 1 school child). Be sure the necessary nutrients are present, and try to keep costs lower by using good substitutes. Your completed list should look something like the chart on page 22. When you have outlined the diet, make a "shopping list" of the total amounts of food required for that menu for a week.

Find the booklet Supermarket Storybook, and read from the beginning to page 12. You will no doubt find out some interesting information. From page 12 on, the authors of the booklet mix fact and opinion, and present a rather one-sided view.

When you have completed all the prescribed reading and assignments, meet together with your instructor and the members of your group to check menus and compare shopping lists and discuss any difficulties. Select the best shopping list from all those in the group and use it for the "consumer research project", which you shall now do...

(4) Group members should divide into pairs and take the shopping list to a nearby supermarket or grocery store. Find the price of each item, and the total cost of the food on the list. Different

pairs should "shop" in different stores. Keep an accurate record and report back to the group at a time arranged with the instructor. Compare the costs. Who got the best value for the money? Do prices on the same items vary from one store to another? Where seems to be the best place to shop? Try to determine if prices vary during the week, and find out if there is a best time to shop! (In the Spring of 1973, in Burnaby, science groups found their cost to be a little under $50.00.)

If you require any further information on nutrition and economical buying, you should contact one of the local resources listed in the Learning Resources for this Item. *

Now review your objectives for this Item. Can you do what they require of you? If not, perhaps a reading in Science will help you. Read pages 295 to 304, and try the review questions which follow. Check your answers with those in the back of the book. In addition, you can test your "Food Dollar I.Q." by doing the little contest below. Compare your marks with that of others in your group.

When you are sure that you have met the objectives for this Item, go on to Item B of this Unit.

* In addition, there is a free and confidential service offered by the B.C. Dietetic Association. It is called "Dial-a-Dietitian". If a person has any question about foods, including preparation, storing, labelling, additives, and so on, he or she may phone in the question between 10 A.M. and 12 Noon on weekdays. An answer will be given within 48 hours. The phone number is 687-6439.

What's Your Food Dollar I.Q.?

Answer "yes" or "no" to the following questions:

1. Do you know about (within two or three dollars) what your family spends on food per week?

2. Do you know what foods are needed for health according to Canada's Food Guide?

3. Do you plan meals on paper before shopping?

4. Do you use a shopping list for buying foods?

5. Do you follow your shopping list in the store (no impulse buying)?

6. Do you read labels for information on quantity and grade of content?

7. Do you plan to shop only once or twice a week?

8. Do you keep up-to-date with new foods and compare them with those you usually use before buying them?

9. Do you know the meaning of the different inspection stamps and brand or grade labels attached to food products?

10. Do you compare the cost, flavor and appearance of foods in different forms - fresh, frozen, canned, dried?

11. Do you follow newspaper reports to know the best time to buy certain foods?

12. Do you know how to prepare the less expensive cuts of meat such as stewing beef to preserve flavor and food value yet develop tenderness?

13. Do you buy meats on the basis of cost per serving rather than cost per pound?

14. Do you follow recipes or label directions carefully when you prepare foods?

15. Do you buy economy sizes when they offer savings, providing you can use the larger amount and have the storage space required?

16. Do you compare prices and quality in different stores?

17. Do you very seldom have food left-over after a meal?

18. Do you compare cost of a convenience food with its home-made counterpart before buying the convenience food?

19. Does your menu plan include the packed lunches and lunches eaten at home as well as supper meals?

20. Do Fancy, Choice and Standard grades of canned products such as peas, peaches, all have the same food value?

21. Do you buy vitamin or mineral supplements only when prescribed by your doctor?

22. Do you use extenders such as rice, macaroni and skim milk powder when cooking group meat dishes?

23. Do you check weekly specials as advertised in newspapers before making your menu.

24. Do you choose cereals for food value rather than for their premium, sweet coatings, advertising or fancy packages?

25. Do you buy meats such as bologna in the piece and slice it at home?

Give yourself four points for each "yes" answer. If your total score is: 80 to 100 - You are an intelligent food buyer

60 to 80 - You can improve

Below 60 - You need to develop buying skills

UNIT III: Health

ITEM B : Disease Prevention

OBJECTIVES

The student must be able to:

1. Identify the most common causes of infectious diseases.
2. Identify some causes of non-infectious diseases.
3. Describe the nature of antibodies and immunity in the body's defence against diseases.
4. Outline the services of the health and care agencies which are available at both the community and provincial level in B.C.

LEARNING RESOURCES

Book: Science, Pomeroy
Life Science, Cambridge Work - A - Text
Local Resources: Local Public Health Office.

LEARNING ACTIVITIES

This Item on disease prevention and treatment should give you some knowledge of how diseases spread and how they can be prevented. More important perhaps, is that you will also become more aware of the various health services available to you and your family.

(1) Read Science, chapter 28, on pages 306 to 314. When you have done this, copy and complete the review questions on page 315.
Then read Life Science, pages 149 to 152 and pages 57 to 163.
Included in this Item are notes taken from a B.C. Hospital Insurance

Services pamphlet. These outline the type of medical care that the citizens of B.C. provide for themselves through the government and the BCHIS. Read these through carefully, and note the wide variety of services which are available to you.

HOSPITAL INSURANCE

The main functions of the British Columbia Hospital Insurance Service (B.C.H.I.S.) since its start on January 1, 1949, have been to protect the residents of the Province from the financial burden of a stay in hospital, to enable hospitals to improve their services by providing them with a steady income, to assist communities in building adequate hospital facilities, and to help hospitals establish and maintain high standards of patient care.

During the 19 years of hospital insurance coverage in British Columbia, daily payments to British Columbia hospitals have increased from $50,000 to over $300,000. More than 8,500 beds have been built, as well as new service areas, such as radiological and laboratory departments, at a total cost in excess of $113,000,000. Provincial Government grants toward these costs exceeded $53,000,000.

Benefits

Residents are provided with the following in-patient benefits, for which the patient pays $1 per day; Standard-ward accommodation, meals, nursing services, and all other available hospital services, such as laboratory and X-ray services, operating-room and case-room facilities, drugs and biologicals, etc. For patients not requiring admission to hospital, B.C.H.I.S. provides emergency services and out-patient surgery benefits at a charge of $2 for each visit.

Activation and Rehabilitation Care

Since September 1, 1960, B.C.H.I.S. coverage has been given to those in-patients of approved hospitals who, in the opinion of medical authorities, will benefit from activation and rehabilitation treatment services. As a result of this programme, many patients have been able to return to their own homes who may have required an indefinite stay in hospital.

Extended Hospital Care

On December 1, 1965, extended hospital care coverage was provided to patients in approved facilities operated by public hospitals, or other non-profit agencies, who do not need acute hospital care but who require skilled nursing care and continuing medical supervision over a lengthly period of time.

Regional Hospital Districts

British Columbia has been divided into large districts to enable regional planning, development, and financing of hospital projects to be carried out

under a revised formula, which increases the Provincial Government grant toward the cost of hospital construction. The board of the regional hospital district will be responsible for co-ordinating the requests for funds from hospitals within the district, and for presenting money by-laws to the taxpayers in respect of either single projects or an over-all programme of hospital projects for the district.

Services Provided to Hospitals

In addition to the payment of hospital accounts and the provision of grants-in-aid toward capital cost, the Hospital Insurance Service also provides specialized services to hospitals and communities. Professional staff consultants assist hospitals with administrative and operational problems, planning and developing construction programmes, site selection, accounting problems, by-law amendments, bed requirement studies, development of disaster plans, assessment of specialized medical equipment needs, development of a medical record system, and work methods studies.

The next part of your assignment for this item requires you to try your skill at locating and using information. Specifically, you are to go with your group to the nearest Public Health office to examine the nature and variety of services offered by this agency.

(2) Make a list of the services offered by your local Public Health Office, and beside each item listed, write a sentence or two explaining it in more detail.

Your list will probably include over a dozen services, ranging from Public Health Inspection to Expectant Parent classes. There will be pamphlets available which will probably give you most of the information you need.

As you list these services, select one which interests you more than the others. Find out all you can about it. If, for example, you are interested in "Dental Health Services", find pamphlets which tell you about it. Ask the receptionist or nurse some specific questions regarding this service. Where and when is it available? Who is it for? Are there any costs involved? And so on--get all the information you can, and make notes as you get it. Plan your questions carefully before you ask them. You are in fact, interviewing this person for the purpose of getting information. This skill in interviewing is also very necessary when job hunting, so it is a useful one to practice!

(3) Writing Assignment: Write a report over half a page in length, on the specific health service which interests you.

Plan your work carefully before you begin writing. Each person in the group must write on a different topic. (there are lots to choose from...) When you have finished your report READ IT ALOUD to the others in your group. This will (a) enable you to hear and correct any mistakes in English, and
(b) enable your group to learn something more about the service which you wrote about.

When all the reports have been completed and read aloud, review the objectives of both Items in the Unit. Then write the Unit III Science Test. Hand in your writing assignment with your completed test.

Science Test

UNIT III

NAME:_____

DATE:_____

Test Score	___ out of 35
Paragraph	___ out of 10
Total Score	___ /45

Exercise 1: Multiple choice. For each question, choose the best answer or phrase from the four choices listed. Circle the letter corresponding to your choice.
(35)

1. Digestion begins in the...

   a) mouth
   b) throat
   c) intestine
   d) stomach

2. Chewing food in the mouth breaks the food into small pieces producing a...

   a) chemical change in the food
   b) physical change in the food
   c) mechanical change in the food
   d) both (a) and (b)

3. Foods containing carbohydrates such as starch and sugar supply the body with...

   a) building materials
   b) repair materials
   c) energy materials
   d) regulating materials

4. When the body is exposed to sunlight, it produces vitamin...

   a) A
   b) B
   c) C
   d) D

5. Lack of vitamin A...

   a) reduces the body's resistance to colds
   b) produces rough, scaly skin
   c) causes night blindness
   d) all of the above

6. Vitamin A is found in...

a) butter
b) green leafy vegetables
c) fruit
d) both (a) and (b)

7. Diseases which are genetic in origin are caused by...

a) antibodies
b) viruses or bacteria
c) abnormal chromosomes
d) parasites

8. For normal growth the body needs...

a) vitamins
b) minerals
c) carbohydrates
d) all of the above

9. Building bones and teeth, clotting of blood, and the regulation of heart and muscles requires calcium which is a...

a) carbohydrate
b) protein
c) mineral
d) vitamin

10. Natural immunity...

a) is an inborn defence against diseases
b) requires the presence of antibodies
c) can be acquired by vaccination
d) is all of the above

11. Goiter is prevented by an adequate body supply of the mineral...

a) calcium
b) iron
c) phosphorous
d) iodine

12. The mineral used in the formation of haemoglobin is...

a) calcium
b) iron
c) phosphorous
d) iodine

13. Vitamin B complex is found in...

a) meat and eggs
b) peas, beans, and green leafy vegetables
c) cereals and milk
d) all of the above foods

14. One of the best food sources of calcium is...

a) bread
b) milk
c) cereal
d) cake

15. Acquired immunity...

a) is an inborn defence against diseases
b) requires the presence of antibodies
c) cannot be acquired by vaccination
d) includes all of the above

16. A good food source of the mineral iodine is...

a) bread
b) milk
c) cake
d) seafood

17. Infectious diseases can be caused by...

a) the presence of antibodies
b) bacteria and viruses
c) abnormal chromosomes
d) all of the above

18. Penecillin is...

a) an antibiotic
b) a disinfectant
c) a tranquilizer
d) a vaccine

19. Iron is found in foods such as...

a) apples
b) liver
c) milk
d) none of the foods listed

20. Foods containing fats are...

a) butter, lard, and oleomargine
b) peanut oil, corn oil, and olive oil
c) meat, fish, poultry
d) all of the above

21. Fats supply the body with...

a) minerals and vitamins
b) energy and heat
c) building and repair materials
d) body regulation materials

22. Each day's meals should include...

a) foods from each group in Canada's Food Guide
b) one carbohydrate and one protein food
c) a piece of fruit
d) a serving of meat

23. Carbohydrates furnish the body with...

a) heat and energy
b) building and repair materials
c) regulating materials
d) materials for normal growth

24. Food sources of carbohydrates are...

a) cereals and bread
b) vegetables
c) cake and candy
d) all of the above foods

25. A dinner based on Canada's Food Guide would include...

a) hot dogs and soft drinks
b) liver, baked potato, baked beans, bread and beverage
c) macaroni and cheese, bread and beverage
d) meat, potatoes, vegetable, salad, fruit, cookies and beverage

26. Proteins supply the body with...

a) heat and energy
b) building and repair materials
c) regulating materials
d) materials for normal growth

27. Food sources of protein are...

a) meat and eggs
b) milk and cheese
c) fish and beans
d) all of the above

28. A midnight snack based on Canada's Food Guide would include...

a) chips and coke
b) an apple or an orange
c) a glass of skim milk
d) either b or c

29. Water is required for...

a) the secretion of glands
b) the excretion of wastes
c) the digestion of food
d) all of the above

30. Energy in food is measured in...

a) units
b) pounds
c) degrees
d) calories

31. An example of a chronic disease is...

a) mumps
b) malaria
c) asthma
d) trichinosis

32. The main function(s) of the B.C. Hospital Insurance Service is/are to...

a) protect B.C. residents from high hospitalization costs
b) assist communities in providing good hospital care
c) enable hospitals to improve their services
d) all of the above

33. If you require immunization you should contact your local...

a) hospital
b) Public Health Nurse
c) doctor
d) Mental Health Unit

34. An example of a communicable disease is...

a) mumps
b) cancer
c) heart disease
d) ulcers

35. If the community pool in which your children swim seems to be dirty and neglected, you should contact...

a) the Public Health Nurse
b) the police
c) the Public Health Inspector
d) the Medical Health Officer

Science

UNIT IV: SAFETY AND FIRST AID

ITEM A : ACCIDENT PREVENTION

OBJECTIVES

The student will be able to:

1. State and apply the principles of accident prevention in the home.
2. State the principles of accident prevention on the job.
3. State the principles of safe driving, and apply these when driving a motor vehicle.
4. State and apply the principles of accident prevention during recreational activities.

LEARNING RESOURCES

Booklet: Have a Safe Day
Driver's Manual
Filmstrip: Electrical Hazards
Local Resources: Police and Fire Department

LEARNING ACTIVITIES

Our main source of information for this Item is the booklet Have a Safe Day. You may have seen it before, since it has been widely distributed in B.C. We are using it because it is brief and to the point, and discusses all the aspects of accident prevention set out in the objectives.

(1) Read pages 29 to 39 in Have a Safe Day. Under the heading "Safety in the Home", list 15 causes of accidents, and under each cause state how such accidents can be prevented.

(2) Read pages 40 to 43, which deal with safety and recreation. Under the headings "Hiking and Camping", "Water Safety", and "Winter Safety", write at least 4 rules for accident prevention, for each topic.

(3) Read pages 15 to 28. These deal with the very important topic of safe driving. Even if you do not own an automobile now,

you may do so at some future date, so it is important to everyone! The writer refers to a "special attitude" in a good driver, and also describes a "point system". Find out what these are. In addition, write down what you think are the 10 most important causes of accidents.

(4) Most of us have had safety instruction as applied to a job we have held at one time or another--it is a very important part of job training in most industries. Read pages 2 to 14. From the many hazards described, pick out five which could have applied to the place where you held your last job. Write these down.

When you have finished the above assignments, get together with the others in your science work-group and view the filmstrip Electrical Hazards, which is a humorous look at a serious topic.

In conclusion, check over your objectives. Are you able to do what they require? Discuss them with members of your group. When you are sure you know them, go on to Item B of this Unit, in which you will learn what to do in the event of an accident or other emergency.

Science

UNIT IV: SAFETY AND FIRST AID

ITEM B: FIRST AID

OBJECTIVES

The student will be able to:

1. Identify what course of action should be taken in the event of an emergency.
2. State the objectives of first-aid.
3. Identify the procedures necessary before carrying out first-aid treatment.
4. Describe and follow the general rules which are applicable in every case of first aid treatment.
5. Demonstrate the use of the booklet Pocket Guide to First Aid, as a reference for treating specific injuries.
6. State how and where one can obtain First Aid training.

LEARNING RESOURCES

Booklet: Pocket Guide to First Aid, St. John Ambulance Society

Sound-Filmstrips: Help, This is an Emergency
Procedures at the Scene of an Accident

Local Resources: Fire Department, Forestry Department, Red Cross, St. John Ambulance Society, Police Department.

LEARNING ACTIVITIES

This Item, in which you are required to study some First Aid procedures, will provide you with knowledge that could be very important at some future time. Do your work carefully and learn what is required of you--it may enable

you to do much more than pass the Unit Science Test!

(1) Read pages 3 to 5 in the Pocket Guide to First Aid. Make notes on what you read, under headings such as "Objectives of First Aid", "First Aid Treatment Procedures", and list sub-headings and descriptions under these. Remember these are notes, so do not copy the entire book! You may keep one of these first aid books for your own reference and use.

Now, from the table of contents, look up "Blistering of Hands and Feet". On what page would you find the treatment for blisters? That's right! Now turn to page 14 and read what the treatment is. Repeat this procedure for "Burns", and "Strains and Sprains" (what is a fracture...?). Do you see that the topics in the book are arranged in alphabetical order? Why do you think that this has been done?

At this point, your science work-group should look at the sound-filmstrip Help, This is an Emergency. This film will give you many good suggestions on what to do when an emergency arises. You will note that it suggests that the viewer (you) take an "American" Red Cross First Aid Course--such courses are available in B.C.

(2) After the film, do the following: Make your own list of emergency numbers to call--ambulance, doctor, fire department, and so on. Take it home and place it where it can be referred to at any instant.

There is a good possibility that someone in your work-group or class has had some training or experience in First Aid. If so, they may be able to help you with any difficulties which you encounter. In addition you may have to make some phone calls or write a letter to get the necessary information to meet objective 6.

Now look at the sound-filmstrip Procedures at the Scence of an Accident. Although the details of some of the procedures of first aid given here vary from the booklet, it is a useful learning aid.

Check all your objectives for this Unit--for both Items. Have you achieved these objectives? On the Unit Science Test you will be asked some very specific questions on the objectives, so be sure you know them in detail before attempting the test! So, do a little more review, then arrange with the instructor to take the test.

Science Test

UNIT IV

NAME:_____

DATE:_____

Student Score:____ /35

Exercise 1: (16) Do or Don't. Listed below are some statements related to safety and emergency situations. If you agree with the statement write DO in the space in front of it. If you think the procedure being described is wrong, write DON'T in front of the statement.

1. _____ drive through a red traffic light.
2. _____ wear a lifejacket while out in a boat.
3. _____ let your attention wander while on the job.
4. _____ give an accident victim a big drink of water, if he requests it.
5. _____ report an auto accident if the damage is a little over $200.00 and only slight injuries result.
6. _____ phone the doctor before sending for an ambulance after a serious accident.
7. _____ drive after you have had only "a couple" of beers.
8. _____ dim your auto headlights at night if the driver of an oncoming car will not dim his.
9. _____ try to become a defensive driver.
10. _____ help an accident casualty walk when you think you know the extent of his injuries.
11. _____ try to accumulate many points under the "Point System" of the Motor Vehicle Branch.
12. _____ reassure an accident victim even if you don't know how serious the injuries are.
13. _____ fasten your seat belt in a car for only a short trip.
14. _____ start artificial respiration before treating serious bleeding on a victim who needs both.
15. _____ replace a household electric fuse that keeps blowing with a heavier one.
16. _____ have a list of numbers to call in an emergency fastened near the phone.

Exercise 2: Answer each question in the space provided.

(15)

1. List the three stated objectives of First Aid.

2. What steps should you take to "diagnose" injuries (findout what is wrong) before beginning to give First Aid. (list at least six)

3. List the 6 General Rules of First Aid treatment.

Exercise 3: Answer in a sentence or two.

(4)

1. Describe how you could use the information in the booklet Pocket Guide to First Aid to help you treat a minor injury at home.

_____

_____

_____

2. Suppose a classmate of yours wished to get some First Aid training; tell where and when this could be done.

_____

_____

_____

UNIT V: DRUGS AND SOCIETY

ITEM A: DRUG PROBLEMS

OBJECTIVES

The student must be able to:

1. (a) Outline the history and origin of the use of drugs.
   (b) State some short and long term effects of drugs on physical health
   (c) State some short and long term effects of drugs on mental health.
   (d) Enumerate some social problems created by the use of drugs.
   (e) Describe the legal status of drugs.

2. Interpret the term "drugs" used above as meaning:
   (a) alcohol
   (b) tobacco
   (c) marijuana
   (d) prescription drugs
   (e) "hard" drugs

3. Identify some organizations which can help a person who has a drug problem.

LEARNING RESOURCES

Sound-filmstrips: Drugs in Our Society, SVE-Singer

Community Resources: Newspaper articles
Magazine stories
Local Public Health Office
Local Public Library
Local RCMP Office
etc...

LEARNING ACTIVITIES

This Unit will provide you with the opportunity to participate in a "demonstration group". The duty of your group will be to teach the other members of the class about a specific drug, and its related problems.

Your instructor will organize the class into demonstration groups, and each group will be responsible for doing all the research, organization and presentation on one of the drugs listed under the second objective. The first objective outlines what you must do. Since the class will be divided into five groups, you will participate with one group and listen to the presentations of the other four. Your group will assume the responsibility of teaching one of the topics to the class. No one else is going to do it. All members of the class will write the final Unit Science Test, which has questions on all of the objectives, so each group has to do a good job of teaching the others!

After the groups have been formed, and the topics selected, here are the steps which you should follow in your work. Your group should....

(a) Discuss the best way to collect materials and information on your topic.

(b) Divide up the work, so each group member has a specific duty.

(c) Gather and bring resource materials back to the class--whether it be pamphlets, books, films, notes, or an arrangement to have a guest speaker.

(d) Examine and evaluate the materials which you have available. Select that which you can use, and prepare your presentation.

(e) Use one of several teaching methods--handing out written notes and accompanying them with a talk; setting up a panel discussion; showing a film (from the Cancer Society, National Film Board, or...) or inviting in a guest speaker.

You should plan on spending about 4 to 6 hours on research and development of your topic to prepare your group for a 20 to 30 minute presentation to the class. If you plan to use a film or filmstrip, preview it first, so you can introduce it and tell the class which important points to look for. Discussion and notes may follow. The presentations will take place during an Oral Communications period.

(1) Writing Assignment: Write a brief evaluation of the teaching performances of the other groups. Then select the one which you think was the best and most effective and tell why you

think it was. Consider such things as interest, the variety of presentations used, the accuracy of their facts, evidence of research carefully done, and their ability to answer questions. Your evaluation should consist of at least two paragraphs and should be over half a page in length. Proof-read your completed composition, checking for complete sentences and variety in sentences, as well as punctuation.

After all the presentations have been completed, and your writing assignment is finished, review the work carefully in preparation for the Unit V Science Test. Hand in your writing assignment with your completed test.

Science Test

UNIT V

NAME:_____

DATE:_____

Test Score____	out of 30
Paragraph ____	out of 15
Total Score ____/45	

Exercise 1: Multiple Choice. For each question choose the best answer from the four choices. Circle the letter which corresponds to your choice.
(18)

1. Drugs used to relieve pain are...

   a) antibiotic
   b) sulfa drugs
   c) analgesic
   d) all of the above

2. Examples of analgesics are...

   a) aspirins
   b) ethers
   c) barbiturates
   d) antibiotics

3. People who peddle drugs are in the business because...

   a) they don't know they are breaking the law
   b) they can make money
   c) they believe drugs can not harm a person
   d) they get jollies out of selling

4. Examples of tranquilizers are...

   a) valium
   b) librium
   c) phenobarbital
   d) all of the above

5. Drugs come from...

   a) plant and animal sources
   b) mineral sources
   c) laboratory sources
   d) all the sources mentioned here

6. Marijauna comes from...

   a) poppy plants
   b) laboratories
   c) hemp plants

7. Examples of Hallucinogenic drugs are...

a) caffeine
b) L.S.D.
c) mescaline
d) both b and c

8. A drug is classed as a narcotic drug when...

a) its use is dangerous to the nervous system
b) its use causes an emotional addiction
c) its use causes a physical addiction
d) its use causes the body to develop a tolerance to it
e) its uses causes all or any of the above reactions

9. One of the strongest arguments that a smoker can give in support of smoking is...

a) it is something to do
b) smoking quietens my nerves
c) my friends do
d) I enjoy it

10. The effects of nicotine on the body are...

a) increase in blood pressure
b) increase in rate of pulse
c) increase in flow of saliva
d) none of the above

11. The most harmful ingredient in tobacco is...

a) smoke
b) nicotine
c) filter
d) sugar

12. When taking a breathalyzer test in B.C. the individual is considered under the influence of alcohol...

a) when his blood alcohol content is .15%
b) when his blood alcohol content is .10%
c) when his blood alcohol content is .08%
d) when his blood alcohol content is .05%

13. The group of drugs controlled by the Food and Drug Act (narcotics)...

a) may be legally bought over the counter
b) must be prescribed by a medical practitioner (doctor)
c) can be legally sold by a pharmacist without a perscription
d) cannot be bought at a drug store

14. A reason or reasons why a young person might try mariguana would be...

a) because of his curiosity
b) because it has no permanent effects
c) because he wanted to keep up with the crowd
d) either a or c

15. People drink because...

a) their friends do
b) it is something to do
c) it relaxes them
d) all of the above reasons

16. Caffeine is a...

a) depressant
b) food
c) stimulant
d) social relaxer

17. Alcoholic beverages are made from...

a) wood alcohol
b) grain alcohol
c) methyl alcohol
d) none of the above

18. If a person in B.C. is an alcoholic he can obtain help from...

a) Alcoholics Anonymous
b) Salvation Army
c) Alcoholism Rehabilitation Center
d) any of the above

Exercise 2: Define the following.

(2) 1. amphetamines _____

2. barbiturates _____

Exercise 3: (10) Matching. Match the concepts in the following two columns by placing the letter proceeding the word in the space in front of the sentence.

_____	1.	The most addicting of the opiate drugs	a) barbiturate
_____	2.	An antibiotic extracted from a mould	b) benydrine
_____	3.	A group of drugs controlled by the Food and Drug Act	c) bromide
_____	4.	The parent of a family of narcotics	d) cocaine
_____	5.	A synthetic drug produced from coal tar	e) demerol
_____	6.	The truth serum drug	f) heroin
_____	7.	An amphetamine (pep pill)	g) marijauna
_____	8.	An intoxicating drug which is made from the Indian Hemp plant	h) morphine
_____	9.	An opium derived drug used in killing pain	i) narcotics
_____	10.	A synthetic drug used in dentistry	j) novocaine
			k) opium
			l) sodium pentothal
			m) penicillin

Science

UNIT VI: Ecology

ITEM A: The Earth and Life

OBJECTIVES

The student must be able to:

1. Define Ecology
2. Describe some limiting factors which affect population.
3. Identify some nutritional relationships of animals and plants between themselves and each other.
4. Identify the major natural communities.
5. Describe some of the interactions and interdependencies in a natural community.

LEARNING RESOURCES

Book: Ecology, Field Research in Science

Sound Filmstrip: Some Ecological Considerations, SVE/Singer

Workbook: Life Science, Cambridge Work-a-text.

LEARNING ACTIVITIES

The study of Ecology is attracting great public attention in the 1970's because we are beginning to realize that man is quite capable of destroying both his environment and himself in his increased use of technology, his great demands on natural resources, and his ignoring of natural laws. In Item A of this Unit, you will study some of these natural laws, or laws of nature, to give you a better understanding of how the natural environment on earth maintains itself. In Item B we will examine man's effect on this environment and look for measures that will protect our natural heritage.

Your main reading source for Item A is Life Science, which will provide up to date information on the science of Ecology.

(1) Read pages 207 to 210. Answer the Review Tests on pages 211 to 214. Check your answers with the answer key.
Then start the Self-Discovery Activity on page 210.

(2) Read pages 215 to 219. Answer the following Review Text questions on pages 221 to 223: 1, 2, 3, 8, 9, 16, 19 and 20. Check your answers.

After completing these exercises you now should have a much better idea of what is called the "balance of nature", and realize how very complex it really is. Now you should look at the sound-filmstrip Some Ecological Considerations, which reviews some of the work done in this Item, and introduces problems considered in Item B.

If you feel you need some additional study, read the pages listed below in Ecology.

objective number	pages
1	1
2	7 to 12
3	14 to 17, 38 to 41
4	32 to 38
5	25 to 31

Now go to Item B.

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UNIT VI: ECOLOGY

ITEM B: MAN AND HIS ENVIRONMENT

OBJECTIVES

The student must be able to:

1. Identify some of the human influences resulting in environmental change, such as;
   - alteration of landscapes
   - depletion of resources
   - extinction of species
   - overpopulation
   - armed conflict
   - pollution
   - high standard of living
2. State some positive measures that an individual can take to protect the environment.

LEARNING RESOURCES

Book: Science, A Way of Knowing

Sound Filmstrip: Evolution and Extinction

Current Publications: Magazine articles
Newspaper stories and features

LEARNING ACTIVITIES

You have but a single assignment for this Item. It is this: Write an essay dealing with an environmental problem in your community. You have already done a good deal of work in preparation for this essay in Item A of this Unit. However, you had better do some more before beginning to write.

(1) Read pages 29 to 39 in Science, A Way of Knowing. Here you will find photos and descriptions of several existing environmental problems.

(2) Look and listen to the sound-filmstrip Evolution and Extinction. Presented here are problems directly related to man's interference in the balance of nature.

A re-reading of your objectives may help you select a topic for your essay. think about your community. What is wrong with the natural environment? What has man done to make the environment worse? Look in the newspapers and magazines for ideas. Avoid choosing the same topic as someone else in the class. Do the following:

1. Identify a real problem.
2. Relate it to the natural environment.
3. Investigate some causes of the problem.
4. Suggest practical methods of control or elimination.

Don't forget about good English usage--refer to your proof reading checklist before handing your work in. Check the following:

1. Paragraph structure. (organization of contents)
2. Sentences and word usage.
3. Spelling and punctuation.
4. Handwriting and neatness.

Your essay should contain about 500 words. It will be marked for two things; content (Science), and structure (English), with half of the marks given for each. Check your work. If you have done everything well that is outlined in the 8 points above, you will get a good mark. The essay will be marked out of 30.

(3) Plan and write your essay. Hand it in when you have finished.

After the essays have been marked, your instructor may arrange for members of your group to read his or her essay aloud to the others. This will help as a test preparation. In addition, review your notes and questions from Item A in preparation for the Unit Progress Test.

Science Test

UNIT VI

Test Score ___	out of 20
Essay mark ___	out of 30
Total score ___	/50

NAME _____

DATE _____

Exercise 1: Multiple Choice. Read each question and choose the phrase which best completes the sentence. Circle the letter which corresponds to this phrase.
(10)

1. Ecology is the study of...
   (a) living things.
   (b) interrelationships between living things and their environment.
   (c) the environment.
   (d) man's utilization of the natural environment.

2. Limiting factors of a plant population can include...
   (a) too much sunlight.
   (b) insufficient rainfall.
   (c) too short a growing season.
   (d) all of the above.

3. An example of an inexhaustible resource is...
   (a) the rabbit
   (b) metals
   (c) fertile soil
   (d) the sun

4. An example of an exhaustible but renewable resource is...
   (a) a forest
   (b) the sun
   (c) coal
   (d) natural gas

5. An example of an exhaustible and non-renewable resource is...
   (a) fertile soil
   (b) a forest
   (c) oil
   (d) the sun

6. The habitat of an organism is...
   (a) its special place to live.
   (b) its special way of life.
   (c) the interaction between itself and others.
   (d) how well it is able to survive competition.

7. The term fauna refers to...
   (a) all plants in a specific community
   (b) all animals in a specific community
   (c) the dominant species in a community
   (d) a group of young deer

8. Organisms that manufacture their own food are...
   (a) independent organisms
   (b) herbivorous organisms
   (c) dependent organisms
   (d) carnivorous organisms

9. A community is...
   (a) the tundra and alpine zones.
   (b) organisims adapted to survive under specialized conditions.
   (c) a specific population of plants and animals.
   (d) all of the above.

10. An individual can contribute to the protection of his environment by...
   (a) helping solve problems which arise in local communities
   (b) encouraging others to become concerned with their environment
   (c) insuring that each organism gets its share of things necessary for its survival without upsetting the delicate balance of nature
   (d) all of the above

Exercise 2: Matching. Place the number of the word on the left, in the bracket beside the sentence on the right which best describes the word. (10)

1. flora	(___)	the science of living things and their environment.
2. leeching	(___)	crops planted following the natural curves and slopes of a hill.
3. competition	(___)	enables an organism to live in a specific environment.
4. contour plowing	(___)	a rivalry between organisms who need the same thing.
5. carnivores	(___)	minerals dissolved by water seeping down through the soil.
6. succession	(___)	a close association between two living organisms.
7. erosion	(___)	meat eating animals.
8. water cycle	(___)	stabilizes the earth's water supply.
9. adaptation	(___)	all the green plants in a community.
10. symbiosis	(___)	a gradual predictable change in a living community.
11. ecology		
12. community		

UNIT VII: Physical Sciences
Item A: Chemistry

OBJECTIVES

The student must be able to:

1. Identify the three states of matter.
2. Distinguish between the mass and weight of an object.
3. distinguish between elements and compounds.
4. Differentiate between chemical and physical change.
5. State the major assumptions of the Kinetic Molecular Theory.
6. Write a report on a chemistry experiment in the prescribed manner.

LEARNING RESOURCES

Books: Science, Pomeroy
Life Science, Cambridge work - A - Text

Chemistry, Experimentation in Science, American Book Co.

Laboratory Experiments in Physical Science, Bickel et al.

Laboratory Apparatus:	400 ml. beaker	matches
	2 test tubes	centimeter ruler
	iron filings	copper sulphate
	test tube brush	

LEARNING ACTIVITIES

Chemistry is the study of the composition and structure of matter, and the changes in composition that these materials undergo. In this Item you will have the opportunity to study some topics in chemistry, and so some chemistry experiments.

(1) Read chapter ten, pages 93 to 103 in Science. When you have done this, complete the review questions on pages 103-104. Compare your answers to those of others in your group.

(2) Read pages 1 to 16 in Chemistry. This booklet will provide you with a more modern concept of the study of chemistry, and how it can effect our daily lives.

As you read the preceeding assignments, make brief notes on what you are studying. Remember to keep referring back to the Objectives of this Item.

You are required to do an experiment in Chemistry, and write out a report on what you did, and what results you obtained. Before beginning the experiment however, there are a number of techniques and laboratory safety precautions which you should consider. First, for the safety of all concerned, use care in handling the apparatus and chemicals--misuse and carelessness can cause serious injury. Be careful with the burner, and never leave it unattended. Bring out all the apparatus and materials which your require before you begin your work, and clean up and put everything away in its proper place upon completion of the experiment. Before beginning the experiment, read the instructions all the way through. Discuss them with the others in your group. Be sure you have a clear idea of what you are required to do. Divide up the work--one person may get out the required materials, while another sets them up and a third reads out instructions. Be sure at least one person in the group records the observations as they occur. Discuss these observations among yourselves, so you can arrive at a logical conclusion. Always ask yourselves, "Did we accomplish the purpose of this experiment?" See pages xi and xii in Life Science for some drawings of typical science equipment.

(3) Do experiment 30, outlined on pages 59 and 60 of Laboratory Experiments. You are required to write out and hand in a report on this experiment.

Write out your report, following this example:

Purpose: To determine the percentage of Oxygen in air.

Apparatus: (list all the equipment which you used...)

Materials: (list all the chemicals which you used...)

Procedure: Describe briefly what you did--this should be an accurate description in the past tense, of all the activities that were done in the experiment. Often a diagram can be very useful, since it enables you to say..."The apparatus was set up as shown in the diagram. The beaker was filled with water to within a centimeter of the top. The test tubes were moistened inside..." and so on.

Observations: (Note carefully what you see, and not what you think you are supposed to see. You should record exactly what happened during your experiment, as it happens.)

Conclusions: (Before writing any conclusions, discuss the results of the experiment with the others in your group. In addition, look back to the purpose of the experiment. Any computations which are necessary should be shown here. If the experiment did not work out the way you think it should have, explain briefly why this may have occurred. Are there any practical applications of the experiment? Discuss these also.

Questions: (Most of the experiments have several relevant questions following the instructions. Answer these in full, and write the answers under this heading.

You will be required to do more science experiment reports as you progress through this course. Do these, following the above example, except if instructed otherwise. Since you will often be asked to hand in these reports with your Unit Test, take care in doing them. The English must be correct, the layout clear and attractive, and the wording precise and accurate.

You may wish to try this.

Purpose: To observe a candle flame.

Apparatus: candle, pan of water, tall cylindrical glass container

Method: Set the lighted candle above the pan of water floating on a piece of wood or cork.
Invert the cylindrical container over the flame and lower the neck of the container below the surface of the water.

Observation: What happens?

Conclusions:

Other possibilities are mentioned on pages 1 - 16 in the book Chemistry. You may be interested in some of them.

When you have completed the work on this Item, go on to Item B.

UNIT VII: Physical Sciences
Item B: Physics

OBJECTIVES

The student must be able to:

1. Define the Term "physics" and describe some of its areas of study
2. Use laboratory apparatus to find weight and volume of given objects.
3. Measure length, weight and volume, and express these in metric units.
4. Calculate the density of a substance, given the necessary data
5. Find the density of an object of irregular shape.
6. State Archimedes' Principle.

LEARNING RESOURCES

Books: Practical Modern Physics, Cambridge

Physical Science, A Modern Approach, Bickel et al.

Laboratory Experiments in Physical Science, Bickel et al.

Laboratory Apparatus:
100 ml. graduated cylinder
triple beam balance
antifreeze or oil
overflow can with beaker
metal block with attached thread
400 ml. beaker
small rock

LEARNING ACTIVITIES

This Item will introduce physics. The word "physics" is from the Greek "physis", which means "nature". Physics is the fundamental science of energy. It is subdivided into studies such as mechanics, heat, sound, electricity, light, and so on.

You will be doing a number of experiments as part of your assignment in this Item. Work closely with the other members of your group--if each one does his part , the work is more likely to be successful. When you are asked to write a report on a specific experiment, follow the example report given in Item A of this Unit very closely.

(1) Do unit on metric measurement in mathematics first.

(2) Read chapter 2, from page 11 to page 14 in Practical Modern Physics. When you have completed this, do the completion questions on page 17.

(3) Read chapter 2, on pages 11 to 23 in Physical Science, Pay particularly close attention to the section on density. Do questions 12 to 19 on page 23. Check your answers with those of others in your group.

Now that you have had an opportunity to read some of the theory of measurement, and become more familiar with the metric system, you can now put this knowledge to use.

(4) Read experiments 2 and 3, on pages 3 to 8 in Laboratory Experiments. It is assumed that you already are able to measure weight and volume, and this reading is only to refresh your memory.

(5) Do experiment 4, outlined on pages 8 to 10 in Laboratory Experiments. For part A, one of the group must bring a small block of wood to class (about 2" x 2" x 3"). Follow the directions given, and record your observations and conclusions in your note-book. Do part B as outlined. For part C, your group must provide itself with some anti-freeze, or perhaps some motor oil. Having procured this, proceed with the experiment and find the density of the liquid. Record your work in your notebook. A formal report is not necessary for this experiment.

(6) Do experiment 16, found on pages 32 and 33 of Laboratory Experiments. In each part follow the directions as given. For a catchbucket, it is alright to use a beaker. In part B, use any piece of metal of a suitable size. As you do this experiment, write a report in the prescribed manner.

Perhaps you could start your report in this way...

Purpose: To determine the density of:
A: a metal by finding the weight of water it displaces.
B: a metal by using Archimedes' Principle.
C: a rock.

Apparatus: (list all the apparatus used.)

Procedure: (describe what you did in each part)
A: An overflow can was filled with water...
B: A metal block was suspended from the spring balance...(you may have to alter the given procedure due to differences in equipment...)
C: A rock was found and weighed...

Observations: (list your observations for each of A, B, and C.)

Conclusions: (what is the density in each case? Show your computations.)

Write out your report carefully and accurately. When it is complete review the Objectives for this and the first Item, in preparation for the Unit Test. When you have written the test, attach both laboratory reports to the test, and hand them in for marking.

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Science Test

UNIT VII

Test Score ___ out of 30 Lab reports ___out of 10 Total score ___ / 40	NAME_____ DATE _____ _____

Exercise 1: (19) Answer the following questions by selecting the phrase which best completes the sentence. Circle the letter which corresponds to the answer you choose.

1. An example of a colloid is
   (a) steel
   (b) whipped cream
   (c) distilled water
   (d) oxygen

2. The process that takes place when a solid changes to a liquid is called...
   (a) melting
   (b) evaporation
   (c) condensation
   (d) sublimation

3. The amount of matter in an object is called its...
   (a) weight
   (b) volume
   (c) density
   (d) none of the above

4. When a liquid changes to a gas...
   (a) the process is called condensation
   (b) heat is given off
   (c) the process is called sublimation
   (d) none of the above

5. A carefully thought out plan for solving a problem or answering a question is known as...
   (a) an experiment
   (b) the scientific method
   (c) the environment
   (d) science

6. One centimeter is equal to...
   (a) 100 meters
   (b) 1 meter
   (c) .01 meter
   (d) 1000 meters

7. The form of matter which has a definite volume but no definite shape is called...
   (a) gas
   (b) solid
   (c) liquid
   (d) mixture

8. The force that holds like particles together is called...
   (a) gravitation
   (b) adhesion
   (c) friction
   (d) cohesion

9. Matter is everything that...
   (a) has energy
   (b) does work
   (c) occupies space
   (d) is made up of elements

10. The temperature at which liquids change to a gas is known as its...
   (a) condensation point
   (b) freezing point
   (c) boiling point
   (d) melting point

11. The space that an object occupies is called its...
   (a) volume
   (b) mass
   (c) area
   (d) density

12. The force that helps to float objects in water is...
   (a) buoyancy
   (b) inertia
   (c) lift
   (d) gravity

13. In solids...
   (a) the molecules move very rapidly
   (b) the molecules move through a great distance
   (c) the cohesive force is very strong.
   (d) the molecules take the shape of the container

14. In a solution whichis made up of a solute and a solvent...
   (a) the solute is dissolved in the solvent
   (b) the solute is present in the greatest quantity.
   (c) the solvent is dissolved in the solute
   (d) none of the above is true.

15. Heat will...
    (a) change the volume of a gas
    (b) increase in pressure
    (c) change density
    (d) all of the above

16. The unit of volume of the metric system is...
    (a) the quart
    (b) the meter
    (c) the liter
    (d) the gram

17. Any substance which will flow is known as a...
    (a) liquid
    (b) fluid
    (c) gas
    (d) mixture

18. A unit of length in the metric system is the...
    (a) quart
    (b) meter
    (c) liter
    (d) gram

19. A drop of water forming a flattened ball on wax paper is caused by...
    (a) cohesion
    (b) density
    (c) adhesion
    (d) gravity

Exercise 2: Problems. Answer each question in the space provided. State units of measurement where necessary. Each question is worth two marks, except #5, which is worth 3 marks.
(11)

1. Ten cubic centimeters of a metal weigh 193 grams. What is the density of the metal?

2. In a few sentences, describe the differences between physical and chemical changes. Give examples.

3. The density of a substance is 0.75. Will it sink in water? Explain.

4. A block of metal 30 mm. wide, 4.5. cm. high and 7.5 cm. long weighs 25 grams. What is the density of the metal?

5. Explain the differences between mixtures, compounds and elements. Give examples of each.

UNIT VIII: Heat, Light, and Sound
ITEM A: Heat

OBJECTIVES

The student must be able to:

1. Define heat.
2. Differentiate between heat and temperature.
3. Appreciate heat transfer -- conduction, convection, radiation
4. Understand termostatic control.

LEARNING RESOURCES

Book: Practical Modern Physics. Galembo, Newman, Robbins.

LEARNING ACTIVITIES

Unit VIII gives a brief introduction to the topics of Heat, Light and Sound. If you wish to do further investigations with heat, consider Unit XIII. In Unit VIII, do Items A, B and C and then write the Unit VIII test. No essay on labs are required, but you may wish to try some experiments if you wish.

Get a copy of Practical Modern Physics and read chapter 12, pages 109 to 112. Explore the "Self-Discovery Activities" on pages 113 to 114. You may also wish to check the boiling and freeqing points of water by placing a thermometer in some ice water and some boiling water. How accurate is the thermometer? Can you think of any reasons why the readings may not be the same as those mentioned on page 110 for the boiling point and the freeqing point?

Then answer questions 1, 3, 5, 6, 10, 11, 14, 15, 17, 18, and 20 on pages 115 and 116. You may wish to use an acetate sheet to save writing out the questions.

You are now ready for Item B.

Science

UNIT VIII: Heat, Light, and Sound
ITEM B: Light

OBJECTIVES

The student must be able to:

1. Define the nature of light.
2. Appreciate the characteristics of light waves.
3. Recognize that light rays bend and reflect.
4. Draw path of light rays to focal point in the eye or a camera.

LEARNING RESOURCES

Book: Practical Modern Physics. Galembo, Newman, Robbins

LEARNING ACTIVITIES

Get a copy of Practical Modern Physics and read Chapter 11, pages 97 to 103. If you have a small camera or eye glasses you may wish to see how the lens is curved and how it is able to focus light. Then answer the questions 1, 3, 5, 6, 9, 11, 13, 14, 17, 27, 32, 34. You may like to do the Multiple Choice questions and/or the Matching Questions on page 108.

You are now ready for Item C.

Science

UNIT VIII: Heat, Light and Sound
ITEM C: Sound

OBJECTIVES

The student must be able to:

1. Define the meaning of sound and how it is produced.
2. Know how sound is transmitted.
3. Appreciate the characteristics of sound waves--frequency.

LEARNING RESOURCES

Book: Practical Modern Physics. Galembo, Newman, Robbins

LEARNING ACTIVITIES

Get a copy of Practical Modern Physics and read Chapter 10, pages 91 to 94. If you have access to a musical instrument you may wish to have a look at it to see how it works. Then answer questions 1, 2, 3, 4, 6, 9, 11 and 13 on page 95. You may wish to look at the Multiple Choice and/or Matching Questions on page 96.

This completes Unit VIII. Review the objectives for Items A, B, and C in preparation for the Unit VIII test. After you have completed the Unit test, you have finished the science core.

Science Test

UNIT VIII

Name: _____

Date: _____

Test Score
___ out of 21

Exercise 1: Answer the following in one or two sentences.
(6)

1. Define heat _____

2. Explain the difference between heat and temperature _____

3. Define the nature of light _____

4. How does light travel through space? _____

5. How is sound produced? _____

6. How is sound transmitted? _____

Exercise 2: Answer the following questions by selecting the phrase which best completes the sentence. Circle the letter which corresponds to the answer you choose. (7)

1. Heat transfer by conduction would be best in...
   (a) air
   (b) wood
   (c) copper
   (d) asbestos

2. Heat transfer by radiation would be best in...
   (a) air
   (b) water
   (c) gold
   (d) aluminum

3. Heat transfer by convection would be best in...
   (a) rubber
   (b) any solid
   (c) gold
   (d) any liquid

4. The bending of light rays is called...
   (a) dispersion
   (b) refraction
   (c) absorption
   (d) diffusion

5. Light rebounding from an object to your eye is called...
   (a) absorption
   (b) dispersion
   (c) conduction
   (d) reflection

6. The number of vibrations made by a vibrating object in one second is called its...
   (a) frequency
   (b) amplitude
   (c) wave length
   (d) velocity

7. Sound is best transmitted by...
   (a) air
   (b) vacuum
   (c) steel
   (d) all of the above

Exercise 3: Matching. Place the number of the word on the left, in the (8) bracket beside the sentence in the right which best describes the word.

1. waves	(___)	a temperature scale
2. thermostat	(___)	depends on frequency
3. amplitude	(___)	used to measure the amount of heat
4. pitch	(___)	how light travels
5. celsius	(___)	a device used to measure temperature
6. vacuum	(___)	a device used to control the temperature in a refrigerator
7. calorie	(___)	a device used to focus light
8. thermometer	(___)	affects the loudness of sound
9. distance		
10. lens		

Science

UNIT IX: CHEMISTRY

ITEM A: PROPERTIES OF MATTER

OBJECTIVES

The student must be able to..,

1. Classify common materials either as solid, liquid, or gas, and qualitative observations with respect to appearance, odour and colour
2. Define and give examples of chemical properties and physical properties of substances.
3. Define and give examples of chemical changes and physical changes.
4. Describe and give examples of each of the following: compound, element, mixture, solution, colloid.
5. Distinguish between mass, weight, and density.

LEARNING RESOURCES

Book: Chemistry, Experimentation in Science

Laboratory Apparatus: sewing needle
three 250 ml. beakers
antiacid tablets
crucible
sodium chloride
calcium chloride
calcium carbonate
copper sulphate
sodium carbonate
vinegar

LEARNING ACTIVITIES

Chemistry is the science dealing with the structure and change in the composition of matter. Careful observation of the world around us, indicates the 2 great entities *matter and energy*.

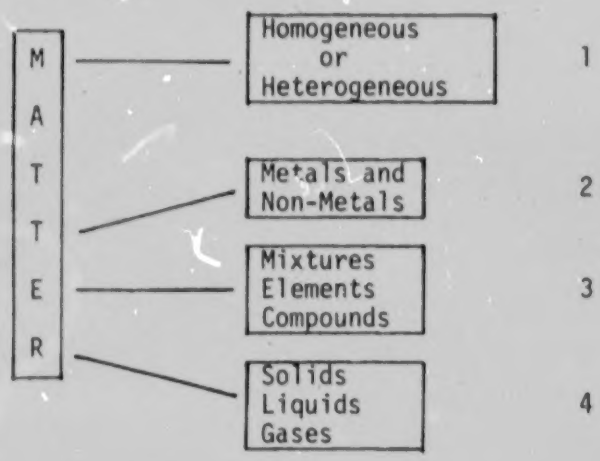
Matter is defined as anything which has mass and occupies space.

The most advantageous method used in approaching any big problem such as this is, *simplification by classification*.

The study of matter can be organized by the use of several different classifications.

The classification you choose depends on the convenience desired or the particular phenomenon being studied.

Here are four very broad classifications of matter:



Study and learn the meaning of these new terms:

HOMOGENEOUS - having similar properties throughout.

HETEROGENEOUS - not uniform throughout; having parts with different properties.

METALS - substances that have a high lustre, are malleable and ductile and are good conductors of heat and electricity.

NON-METALS - poor conductors of heat and electricity.

MIXTURES - contain 2 or more substances; they may be homogeneous or heterogeneous, but they can always be separated by physical processes.

ELEMENT - a pure substance which cannot be decomposed by ordinary chemical reaction into simpler substances.

COMPOUND - a pure substance formed by chemical combination of 2 or more elements.

* Check the difference between COMPOUNDS & MIXTURES!

Solids, Liquids and Gases: These are called the physical states of matter. Theoretically every substance can exist in these 3 states, but although all substances can be solidified, some decompose when they are heated in an attempt to change them to a liquid or to a gas. For example: sugar decomposes before it vapourizes.

Elements with similar properties are grouped into *families*. Properties are the characteristics by which we identify substances. For convenience, distinction is made between *PHYSICAL PROPERTIES AND CHEMICAL PROPERTIES*.

Among physical properties are included such characteristics as:

1) colour
2) odour
3) hardness
4) solubility
5) boiling point & freezing point

Chemical properties include characteristics such as:

1) stability (toward decomposition)
2) reactivity

Chemical Changes: Reactions in which a new substance or substances are formed are called chemical changes. Here are some examples:

1) Iron rusts - in this reaction a new substance - rust or iron is formed.
2) Carbon burns - a new substance carbon dioxide is formed.
3) Water is electrolysed - oxygen and hydrogen - 2 new substances are formed.

Physical Changes: Reactions which involve a change in the form or state of a substance, but do not involve the production of a new substance are called physical changes. For example:

> Water boils to form steam (water vapour) no new products are formed. Water only changes from the liquid to the gaseous state.

(1) Read pages 1-17 in Chemistry. Some of this will be review for you, since you looked at it when you studied Unit VII. However, work carefully, and make notes on the main topics discussed. When you have completed your reading, do the questions 1 to 8 on page 19; then do the exercise "Using New Words" on the same page.

SAFETY IN THE LABORATORY

Safety Rules for the Student

The Work Area:

It becomes the responsibility of the group to organize and maintain the cleanliness of the area. During the actual experimental work, it is suggested that you remain standing. This ensures that better attention is paid to the experiment and enables you to move away quickly in the event of an accident in the area. During the progress of an experiment you should remain in the working area.

A cupboard, drawer or lab kit should be kept closed unless something is being put into or removed from it. The working area should be free of all books except the instructions and record book. Too often science notes have been ruined when left on desks during an experiment.

Disposal of Wastes

(a) Broken glass should be disposed of in a special container separate from waste paper.

(b) Soluble chemical wastes should be washed down the sink with plenty of water.

(c) Solid chemical wastes should be disposed of in a special container separate from waste paper.

Heating Liquids in a Test Tube

(a) Never fill the test tube more than about two thirds full of the liquid that is to be heated.

(b) "Bumping" is caused by heating the liquid at one point, causing steam to form which ejects the hot contents. To avoid this, move the test tube back and forth over the flame to heat the liquid uniformly.

(c) In case bumping does take place, the mouth of the test tube must never be directed towards another student.

Handling a Burner

(a) The burner is easier to light when it is only slightly turned on.

(b) Never light the burner until you are ready to use the heat it supplies.

(c) Never leave a burner unattended.

(4) When working around a burner be careful of long hair and loose clothing.

The Smelling of Gases

Never smell any bottle or gas directly by inhaling. Hold the container about a foot away from the nostrils and waft any odour towards the nostrils with the other hand.

Diluting Acids

When diluting acids always pour the acid slowly into the water. Stir the mixture constantly to dissipate any heat generated.

The Insertion of Glass Tubing into Stoppers

Only the teacher or a trained class member should insert tubing into stoppers. Use the special rubber holder and use lubrication on the stopper and tubing.

Chemicals

Students should respect but not fear the chemicals used in the laboratory. Many are corrosive and poisonous. Read labels carefully before using and take note of any special precautions the instructor issues.

Safety Equipment:

(a) Fire Extinguisher. Learn the location of the extinguisher and ask for instructions on how to use.

(b) When acids and bases are being used a quantity of neutralizer should be available. For acid spills a saturated solution of baking solution should be kept in a one litre container available for an emergency. The container should be labelled "For Acid Spills". For base spills a dilute solution of acetic acid should be kept on hand and labelled "For Base Spills".

First Aid

(a) In case of minor burns, cuts, etc., procure first aid.

(b) Be sure you know what emergency procedures to undertake, in the event that a serious injury occurs.

(2) Bring a sewing needle to class and try the experiment outlined on page 7 of Chemistry. If you have some difficulties, coat the needle with wax (rub it on a candle) and try again.

(3) Bring an antacid table (Tums, Bromo-Seltzer) tablet to class and try the experiment outlined on page 9 of Chemistry. Discuss the answers to the questions with your group.

(4) Have a closer look at the ideas of solubility and solutions by doing the experiment outlined on page 11 of Chemistry. Discuss what you see in each case.

(5) You can do a laboratory example of a chemical reaction by doing activity #5. outlined on page 19 of Chemistry under the title "Things to Do". The copper sulphate and washing soda (Sodium carbonate) are available from the chemistry supplies, but you may have to bring your own vinegar. Discuss the results.

When you have finished the above assignments, review your work and the objectives in a discussion with the other members of your group and your instructor. When you know what is required of you, go on to Item B.

UNIT IX: CHEMISTRY

ITEM B: ELEMENTS AND COMPOUNDS

OBJECTIVES

The student will be able to . . .

1. Draw and explain Bohr's model of an atom of a given element, using the periodic table.
2. Explain the concepts of Atomic number and atomic weight.
3. List the symbols for about 20 common elements.
4. Construct formulas of simple compounds, using the Periodic Table.
5. Define the terms "Valence" and "ion", and describe their relationship.

LEARNING RESOURCES

Books: Chemistry, Experimentation in Science

Physical Science, A Modern Approach

LEARNING ACTIVITIES

In this Item you will begin your study of the theoretical aspects of Chemistry. In Item 1 we dealt with the classification and description of matter, and now we will have a closer look at what makes substances have different properties.

(1) Read pages 174 to 180 in Physical Science. Note the contributions of Dalton, Rutherford, Chadwick and especially Nels Bohr to the formation of modern atomic theory. Now read pages 20 to 26 in Chemistry. Be sure to keep your Objectives for this Item in mind,and select what you have been asked to learn. Do questions 1, 6, 14, 15, 16, 17, 18, and 19 on page 180 of Physical Science. In addition, your group would benefit from a brief discussion of the Review questions and the "Questions to Think About" found on page 26 of Chemistry.

You will now study briefly a basic concept of chemistry - The Periodic Table. It will be used as a reference, like a dictionary, and you will have to learn a little about it before you can use it. This chart of elements was devised by a Russian scientist called Mendeleev (Men-del-ā-ev) and proved to be so accurate that he was able to predict the existance of several elements many years before other scientists actually discovered them!

(2) Read pages 26 to 33 in Chemistry. Read carefully the description of the structure and arrangement of the Table, but do not attempt to memorize it. Study the key very carefully, so you know what each number and symbol represents.

Now, after studying this, could you meet objectives 1 and 2? You should be able to!

Relatively few of the elements exist in their pure form. Most of them are combined with other substances to form compounds, and sometimes these compounds further combine to form complex mixtures, of which loam soil is an example. Science has evolved a very orderly method of describing these materials, through using a system of symbols and formulas. You have already been introduced to the idea and uses of symbols, so we will review these, and then go on to formulas.

(3) Read pages 36 to 45 in Chemistry, omitting pages 40 and part of 41, which deal with oxidation-reduction. Be sure you know the differences between molecular and structural formulas.

(4) Make a list of the symbols of 20 to 30 of the most common elements (start with those of atomic numbers 1 to 20, then perhaps add numbers 25 to 30, then go on to a few heavy metals.) (such as Pb and Au.) You will find that as you work on formulas you will quickly learn these symbols!

FORMULAE OF BINARY COMPOUNDS

Introduction

When atoms unite to form compounds there is a transfer to sharing of electrons to form the bonds which hold the atoms together.

The number of electrons lost by the atoms of one element must be the same as the number of electrons gained by the atoms of the other element.

The valence of an element (also a radical or ion) is an indication of the number of electrons gained or lost by atoms of that element (radical or ion) during a reaction. Using the fact that the number of electrons lost and gained is the same, the valences of the elements can be used together with the atomic symbols for the elements to write the formula of any binary compound.

The method follows the steps:

1. Write the atomic symbols for the two elements, putting the element with the positive valence first;
2. Write the valence of the positive element as a sub-script of the negative element;
3. Write the valence of the negative element as a sub-script of the positive element;
4. Simplify by dividing through by any common factor, and/or omitting any '1's.

Note that if a radical such as ammonium is involved, then brackets must be used to indicate the atoms to which the sub-script refers.

Examples:

1.	sodium chloride	Na Cl	-	Na_1Cl_1	-	NaCl		
2.	aluminum oxide	Al_2O_3	-	Al_2O_3	-			
3.	hydrogen sulphide	H S	-	H_2S_1	-	H_2S		
4.	nickel oxide	Ni O	-	Ni_2O_2	-	Ni_1O_1	-	NiO
5.	ammonium bromide	NH_4Br	-	$(NH_4)_1Br_1$	-	$(NH_4)Br$	-	NH_4Br
6.	ammonium sulphide	NH_4S	-	$(NH_4)_2S_1$	-	$(NH_4)_2S$		
7.	carbon oxide	C O	-	C_2O_4	-	C_1O_2	-	CO_2

Formulae of binary compounds cont.

Exercise:

Write the formulae for each of the following in the space provided -

silver bromide		aluminum carbide	
lead iodide		zinc oxide	
aluminum nitride		nitrogen oxide	
manganese sulphide		potassium nitride	
magnesium oxide		aluminum chloride	
antimony sulphide		arsenic bromide	
cadmium iodide		sodium sulphide	
potassium oxide		calcium nitride	
cobalt iodide		chromium sulphide	
lead sulphide		sodium arsenide	
carbon sulphide		chromium oxide	
hydrogen chloride		silver sulphide	
lead iodide		hydrogen bromide	
phosphorus hydride		boron hydride	
aluminum phosphide		hydrogen iodide	
ammonium chloride		magnesium nitride	
sodium hydride		potassium chloride	
barium fluoride		cadmium carbide	

FORMULAS AND NOMENCLATURE

The nomenclature used by Chemists to describe compounds has been so devised that the name of the compound is directly obtainable from the formula. Likewise the formula of a compound is available from its name. Compounds composed of 2 elements only are called binary compounds.

NAMING OF BINARY COMPOUNDS

The name of any binary compound is derived from the names of the elements forming that compound. The method is:

1. Write the name of the element with the positive valence.
2. Write the name of the element with the negative valence.
3. Change the ending of the second name to '-ide'.

e.g. NaCl - sodium chloride
CaI_2 - calcium iodide

The following exceptions should be noted:

1. The radical or ion ammonium, NH_4^+, is treated for formula purposes as an element eg. NH_4Cl - ammonium chloride.

2. Some oxides contain more oxygen than normal valence rules would indicate, and are called 'peroxides'. These are:

   H_2O_2 - hydrogen peroxide

   Na_2O_2 - sodium peroxide

   K_2O_2 - potassium peroxide

   BaO_2 - barium peroxide

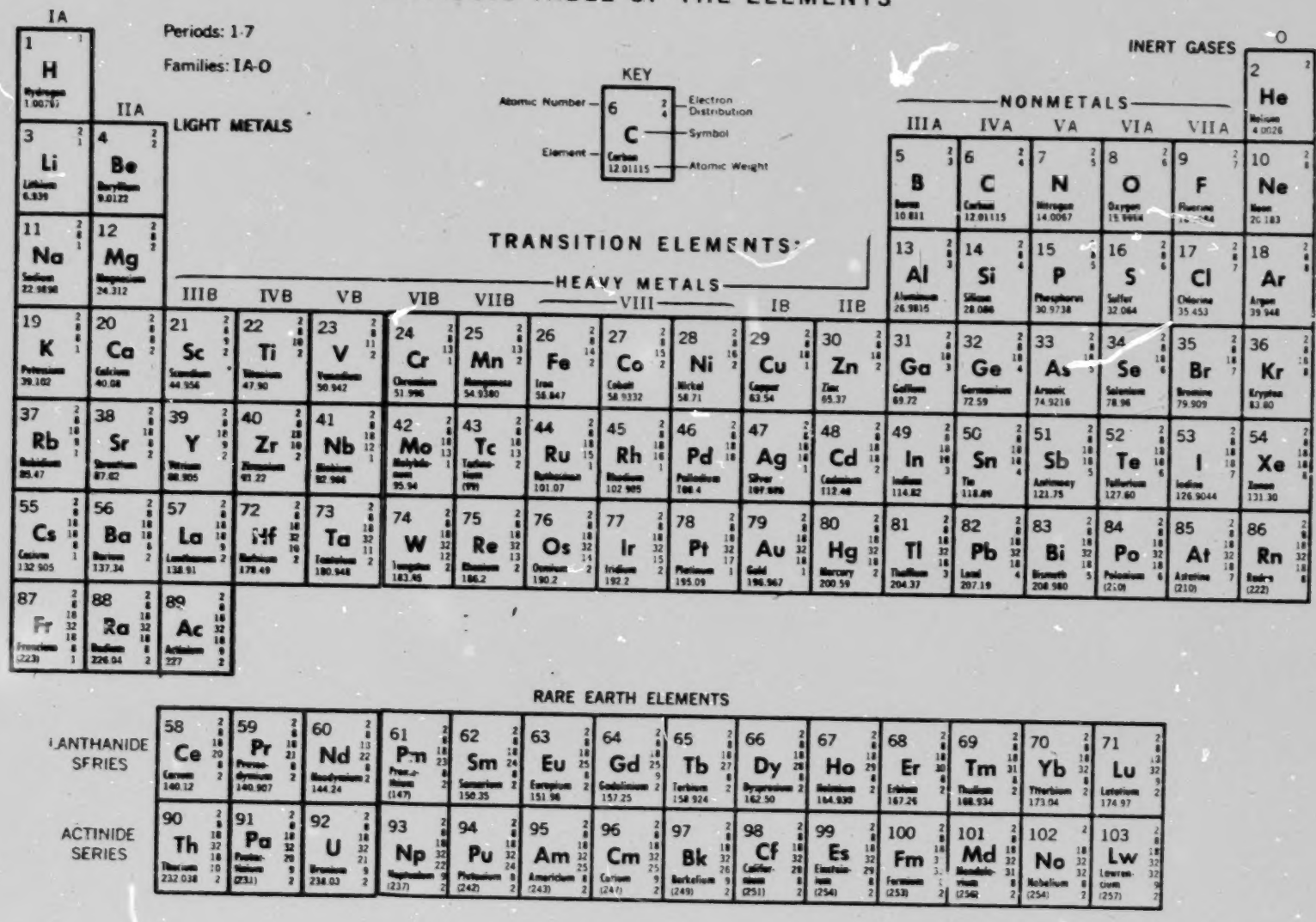
Complete the following chart to show the names of the following binary compounds.

NaBr		Na_2O_2	
$CaCl_2$		CaC_2	
$(NH_4)_2S$		K_3As	
H_2O		Fe_2S_3	
NH_3		ZnH_2	
MgH_2		Mg_3N_2	
K_2O		Mn_3P_2	
BaS		Al_4C_3	
CaF_2		Ag_2S	
NiO		NH_4I	

(5) Read pages 158-161 in Physical Science. Answer question 1 - 9 on pages 163-164. Use the Periodic Table to help you, and do these questions with the other members of your group.

This work completes your assignments for Item 2. Have you met your objectives? Discuss them with your group members and your instructor. When you are sure you know what is required, go on to Item 3.

PERIODIC TABLE OF THE ELEMENTS



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Answers to exercise on page 3:

silver bromide	$AgBr$	aluminum carbide	Al_4C_3
lead iodide	PbI_4	zinc oxide	ZnO
aluminum nitride	AlN	nitrogen oxide	N_2O_5
manganese sulphide	MnS	potassium nitride	K_3N
magnesium oxide	MgO	aluminum chloride	$AlCl_3$
antimony sulphide	Sb_2S_5	arsenic bromide	$AsBr_5$
cadmium iodide	CdI_2	sodium sulphide	Na_2S
potassium oxide	K_2O	calcium nitride	Ca_3N_2
cobalt iodide	CoI_2	chromium sulphide	Cr_2S
lead sulphide	PbS_2	sodium arsenide	Na_3As
carbon sulphide	CS_2	chromium oxide	Cr_2O
hydrogen chloride	HCl	silver sulphide	Ag_2S
lead iodide	PbI_4	hydrogen bromide	HBr
phosphorus hydride	$P(OH)_3$	boron hydride	BH_5
aluminum phosphide	AlP	hydrogen iodide	HI
ammonium chloride	NH_4Cl	magnesium nitride	Mg_3N_2
sodium hydride	NaH	potassium chloride	KCl
barium fluoride	BaF_2	cadmium carbide	Cd_2C

Answers to exercise on page 4:

$NaBr$	Sodium Bromide	Na_2O_2	Sodium Peroxide
$CaCl_2$	Calcium Chloride	CaC_2	Calcium Carbide
$(NH_4)_2S$	Ammonium Sulphide	K_3As	Potassium Arsenide
H_2O	Water (Hydrogen oxide)	Fe_2S_3	Ferrous (Iron) Sulfide
NH_3	Ammonia	ZnH_2	Zinc Hydride
MgH_2	Magnesium Hydride	Mg_3N_2	Magnesium Nitride
K_2O	Potassium Oxide	Mn_3P_2	Manganese Phosphide
BaS	Barium Sulfide	Al_4C_3	Aluminum Carbide
CaF_2	Calcium Fluoride	Ag_2S	Silver Sulfide
NiO	Nickel Oxide	NH_4I	Ammonium Iodide

UNIT IX: CHEMISTRY

ITEM C: CHEMICAL REACTIONS

OBJECTIVES

The Student will be able to . . .

1. Write a balanced equation for a simple chemical reaction.
2. State the Law of Conservation of Mass.
3. Explain the relationship between chemical reactions and energy.
4. Recognize and explain simple examples of chemical and physical equilibrium.
5. Differentiate between, and give examples of acids, bases and salts.
6. Identify several factors such as temperature, concentration, and catalysts, which effect the rate of chemical reactions.

LEARNING RESOURCES

Books: Physical Science, A Modern Approach

Chemistry, Experimentation in Science

Laboratory Apparatus: antiacid tablets
two 100 ml. beakers
cubes of sugar
tongs
red litmus paper
blue litmus paper
a weak acid (vinegar)
a weak base (sodium hydroxide)
hydrocloric acid (dilute)

LEARNING ACTIVITIES

One of the basic ideas in the study of chemistry is to learn about the changes in composition of matter. In Items 1 and 2 we did the foundations for this study - learning about elements, and their relationship to each other as shown on the Periodic Table; learning about how elements combine to form compounds, and learning how we use a variety of symbols and formulas to represent these things. In this Item you will study simple chemical reactions, and how we make word and symbol equations to represent and describe some of these reactions. You will do some laboratory experiments which will illustrate some of the ideas which you read about. Finally, you will learn a little about three important classes of compounds - acids, bases, and salts.

Rules for Writing and Balancing Chemical Equations

1. The correct formulas for the reactants and products must be known or determined by use of valence or oxidation numbers.

2. The formulas for the reactants are written to the left of the arrow and those of the products to the right.

3. The equation is now ready to be balanced.

   a) Count and compare the number of atoms of each element on both sides of the equation to determine those that are unbalanced.

   b) Balance each element one at a time by placing small whole numbers (coefficients) in front of the formulas of the substances containing the unbalanced element so that the number of atoms of each element is the same on both sides of the equation.

   c) Check all the elements after each individual element is balanced to see if in balancing one element, others have become unbalanced.

   d) It is usually advantageous to balance all elements other than H and O first, then balance H and finally O.

   e) The final balanced equation should contain whole number coefficients in the smallest ratio possible. Compare:

$$4HgO \longrightarrow 4Hg + 2O_2 \qquad \text{incorrect}$$
$$2HgO \longrightarrow 2Hg + O_2 \qquad \text{correct}$$

Information Obtainable from a Balanced Equation

1. What the reactants and what the products are.

2. The formulas of the reactants and products.

3. The number of molecules of reactants and products in the reaction.

4. The number of atoms of each element involved in the reaction.

5. The relative number of moles of each substance used or produced.

Exercise on Balancing Equations - All formulas are correct!

1. $NH_3 \longrightarrow N_2 + H_2$
2. $Al + HCl \longrightarrow AlCl_3 + H_2$
3. $KClO_3 \longrightarrow KCl + O_2$
4. $NH_3 + H_2SO_4 \longrightarrow (NH_4)_2SO_4$
5. $SO_2 + O_2 \longrightarrow SO_3$
6. $BaO_2 + H_3PO_4 \longrightarrow Ba_3(PO_4)_2 + H_2O_2$
7. $CaCO_3 + HCl \longrightarrow CaCl_2 + H_2O + CO_2$
8. $P + Cl_2 \longrightarrow PCl_5$
9. $Ca(OH)_2 + HNO_3 \longrightarrow Ca(NO_3)_2 + H_2O$
10. $H_2SO_4 + HI \longrightarrow H_2S + I_2 + H_2O$
11. $Zn + H_3PO_4 \longrightarrow Zn_3(PO_4)_2 + H_2$
12. $FeO + O_2 \longrightarrow Fe_2O_3$
13. $NO + O_2 \longrightarrow NO_2$
14. $Al + C_2 \longrightarrow Al_2C_6$
15. $Zn + O_2 \longrightarrow ZnO$

To get started, read pages 46 to 61 in Chemistry. As you read, keep referring to the Objectives for this Item, and be sure you concentrate on them.

1) Do the Review Questions, found on the top of page 49 in Chemistry. When you have finished these, do question 5 on page 51, under "Looking Back".

2) Do Review Questions 1 - 4 on page 57 of Chemistry, and then do questions 1-5 on page 61 of the same book.

As you do the above assignments, compare your answers with those of others in your group. If this is not convenient, be sure you compare your answers with the others before you finish this Item.

3) You have read that a number of factors affect the rate or speed of a chemical reaction - one of these is the amount of surface area exposed between the reacting substances. To observe this, do the experiment outlined on the top of page 53 in Chemistry. Bring your own antacid tablets to class.

4) To study another factor affecting chemical reactions, do the experiment outlined on top of page 54 in Chemistry. What affects the rate of chemical reaction here?

5) Study the reaction of indicators by doing the experiment outlined on page 59 of Chemistry. Litmus paper is only one of many indicators used in chemistry and in industry employing chemical processes.

By now, you are beginning to understand what our study of chemical reactions is all about. However, to be sure that you fully comprehend the theory involved in our study read pages 161 to 163 in Physical Science.

6) When you have completed the reading, do questions 10, 11, and 12 on page 164 of Physical Science.

To have another look at the nature of chemical bonds and how they effect chemical reactions, read pages 180 to 187 in Physical Science.

7) After reading the above, do questions 1-8 on page 188 in Physical Science.

8) Do experiment 16-1, A Neutralization Reaction, outlined on pages 185 and 186 in Physical Science. Write out a full report on this experiment, including an explanation of the results and an equation which represents the reaction.

This completes the assignments for this Item and this Unit. Do a thorough review before you attempt the Unit Progress Test. Discuss all the objectives with the others in your science group. Ask your instructor to clear up any difficulties. When you feel that each one in the group knows the work, write the Unit Progress Test.

Answers to exercise on page 53

Exercise on Balancing Equations

1. $2NH_3 \longrightarrow N_2 + 3H_2$
2. $2Al + 6HCl \longrightarrow 2AlCl_3 + 3H_2$
3. $2KClO_3 \longrightarrow 2KCl + 3O_2$
4. $2NH_3 + H_2SO_4 \longrightarrow (NH_4)_2SO_4$
5. $2SO_2 + O_2 \longrightarrow 2SO_3$
6. $3BaO_2 + 2H_3PO_4 \longrightarrow Ba_3(PO_4)_2 + 3H_2O_2$
7. $CaCO_3 + 2HCl \longrightarrow CaCl_2 + H_2O + CO_2$
8. $2P + 5Cl_2 \longrightarrow 2PCl_5$
9. $Ca(OH)_2 + 2HNO_3 \longrightarrow Ca(NO_3)_2 + 2H_2O$
10. $H_2SO_4 + 8HI \longrightarrow H_2S + 4I_2 + 4H_2O$
11. $3Zn + 2H_3PO_4 \longrightarrow Zn_3(PO_4)_2 + 3H_2$
12. $4FeO + O_2 \longrightarrow 2Fe_2O_3$
13. $2NO + O_2 \longrightarrow 2NO_2$
14. $2Al + 3C_2 \longrightarrow Al_2C_6$
15. $2Zn + O_2 \longrightarrow 2ZnO$

Science Test

UNIT IX

Name:_____

Score ___ /68

Date:_____

Exercise 1: (15) Matching. Match the word or words in the left-hand column with the correct phrase in the right-hand column.

____	element	a.	sugar dissolved in water
____	metal	b.	describes the appearance of a substance
____	mixture	c.	a substance such as carbon
____	symbol	d.	burning of a fuel
____	physical change	e.	carbon dioxide
____	solution	f.	a substance such as sea water
____	chemical change	g.	substance made up of one kind of atoms
____	physical properties	h.	describe the behavior of a substance
____	compound	i.	the number of positive or negative charges acquired by an atom.
____	chemical properties	j.	an element that is usually a good conductor
____	valence	k.	the amount of matter an object contains
____	non-metal	l.	abbreviated sign for an element
____	colloid	m.	a short name for a combination of elements
____	mass	n.	uniform mixture of a solute and a solvent
____	density	o.	weight per unit volume
		p.	a mixture of one substance suspended in another

Exercise 2: Fill in the blanks.
(24)

1. Supply a name for each of the following chemical symbols.

Cl		Na	
H		Au	
C		K	
S		Ni	
Zn		Ag	
P		Fe	
O		Pb	
N		Hg	
Ca		Cu	

2. Supply the missing numbers.

a) For the chemical formula, $3H_2SO_4$, there are indicated:

_____ elements in the compound.
_____ molecules of the substance.
_____ atoms of hydrogen.
_____ atoms of sulfur.
_____ atoms of oxygen.
_____ atoms altogether.

Exercise 3: Do each question as instructed.
(17)

1. Classify the following properties of substances as either PHYSICAL or CHEMICAL:

a) hydrogen is a colourless gas. _____
b) oxygen supports combustion. _____
c) diamond is the hardest natural substance known. _____
d) menthyl alcohol boils at $78^{o}C$. _____
e) potassium is a soft metal. _____
f) phosphorus ignites when exposed to air. _____

2. Classify the following as either PHYSICAL OR CHEMICAL changes.
   a) the rusting of an iron nail. _____
   b) evaporation of water from a lake. _____
   c) the liquification of air. _____
   d) toasting bread. _____
   e) tarnishing of silver. _____

3. Write complete, balanced equations for the following reactions:
   a) aluminum + hydrochloric acid yields aluminum chloride + hydrogen.

   b) calcium carbonate heated yields calcium oxide + carbon dioxide

   c) calcium + water yields calcium hydroxide + hydrogen

4. Balance the following chemical equations with respect to atoms.
   a) $Ca + HCl \longrightarrow CaCl_2 + H_2$
   b) $FeS + HCl \longrightarrow FeCl_2 + H_2S$
   c) $NH_3 + O_2 \longrightarrow HNO_3 + H_2O$

Exercise 4: (12) Multiple Choice. Circle the letter of the phrase which best completes the sentence or answers the question.

1. Whatever has mass and occupies space is known as:
   a) compound
   b) matter
   c) weight
   d) an element
2. A substance, all of whose atoms are identical chemically is:
   a) a compound
   b) a molecule
   c) a solid
   d) an element
3. The elements making up a compound:
   a) are present in definite fixed proportions
   b) may not be separated by chemical means
   c) it contains more than one element
   d) it cannot be separated by chemical means

4. A mixture differs from a compound in that:
   a) its composition is not fixed
   b) it is always heterogeneous
   c) it contains more than one element
   d) it cannot be separated by chemical means

5. When a substance undergoes a physical change:
   a) a new substance is produced
   b) a gas is formed
   c) heat is evolved
   d) the molecules remain unchanged

6. The melting of ice is a physical change because:
   a) the process is reversible
   b) the process is exothermic
   c) no new substance is produced
   d) there is no energy change

7. The rusting of iron is a chemical change because:
   a) a new substance is formed
   b) iron rust is a compound of definite composition
   c) heat is evolved
   d) decomposition has occurred

8. The law of conservation of mass-energy requires that:
   a) matter can neither be created nor destroyed
   b) energy can neither be created nor destroyed
   c) kinetic and potential energy are equivalent to each other
   d) destruction of mass is accompanied by the disappearance of an equivalent amount of energy

9. The amount of quantity of matter in a substance is expressed in terms of its:
   a) mass
   b) weight
   c) density
   d) volume

10. The attraction between two atoms within a molecule is called:
    a) a chemical bond
    b) a covalent bond
    c) electrostatic attraction
    d) polarity

11. Formation of a chemical bond always involves:
    a) transfer or sharing of electrons
    b) loss or gain of electrons
    c) ionization
    d) a change in valence

12. In a neutralization reaction:
    a) Acid + base $\longrightarrow$ salt + water
    b) the hydrogen ions of the acid react with the hydroxide ions of the base
    c) water does not ionize
    d) all of the above will be true.

UNIT X: MECHANICS

ITEM A: FORCES AND WORK

OBJECTIVES

The student will be able to:

1. Identify the different types of energy and give examples of each.
2. Define and measure work.
3. Define and measure power.
4. Define and measure friction.
5. Identify force and acceleration, as applied to mechanical problems.

LEARNING RESOURCES

Books: Physical Science, A Modern Approach

Laboratory Experiments in Physical Science

Laboratory Apparatus:

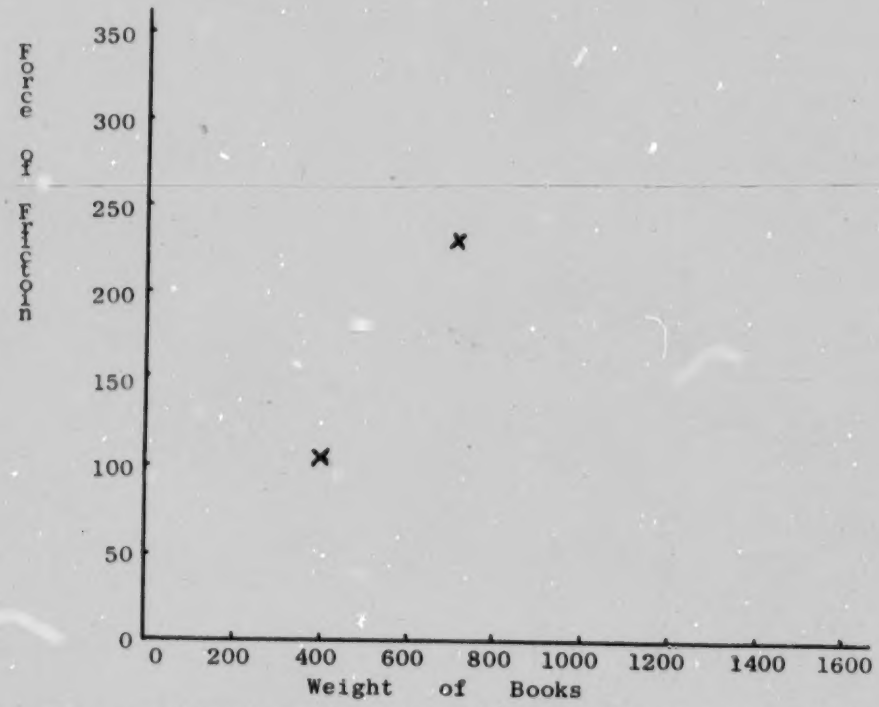
- balances
- string
- books
- spring balance
- inclined plane (board)

LEARNING ACTIVITIES

Force and work can take many forms. We can read at almost any time in our daily newspapers about political forces and how they work (or sometimes, do not work!). However, these are not the types of force and work you will be dealing with in this Item. To find out a little more about work and force, as they are related to physics and mechanics, do the following:

(1) Read pages 26 to 32 in Physical Science. When you have finished this, do Experiment 8 in Laboratory Experiments.

As you do the experiment, write out your report. State the Object or purpose of the experiment. List the apparatus used. Describe your procedures and make a table on which to enter your observations. What conclusions can you come to? In preparing the required graph, follow the directions given. (You may already have done some work with graphs in Unit IX in Mathematics.) Your graph should look something like the sample below.



Can you see that the graph shows that it required a 100 gm. force to pull a 400 gm book? What force was required for the second book? How much did it weigh? (230 gm; 700 gm) When you have finished marking in (plotting) all your points, draw a straight line through them. This line may not touch all of the points, but it should be close to all of them.

Answer the two questions found on page 18, in the space on your report following the Conclusions. Prepare your report for handing in with the Unit Test.

(2) Read pages 32 to 38 in Physical Science. Now do questions 1, 5, 6, 7, 8, 10, and 11 on page 39. Write the answers in your notebook. When you have finished this, do the odd numbered problems on pages 39 and 40

(3) Do experiment 11, which is outlined on pages 22 to 24 in Laboratory Experiments.

You will have to bring a piece of board to class--about 8 inches wide and three feet long. Procure this before you plan to do the assignment. Tabulate your data carefully in your science notebooks, and do all the calculations necessary to find the effeciency for each trial. A formal report for this experiment is not necessary.

When you have finished these assignments, discuss them with your group and get any extra help you need from the instructor. If you feel you need some extra practice in problems, do some of the even numbered problems on pages 39 and 40. Check your Objectives before you proceed to Item B.

UNIT X: MECHANICS
ITEM B: SIMPLE MACHINES

OBJECTIVES

The student will be able to....

1. Identify the six types of simple machines.
2. Identify the three classes of levers.
3. Calculate the mechanical advantage of a simple machine, given the necessary data.
4. Calculate the efficiency of a machine, given the necessary data.

LEARNING RESOURCES

Books: Physical Science, A Modern Approach

Laboratory Experiments in Physical Science

Practical Modern Physics, Cambridge

Laboratory Apparatus:

meter stick and lever holder	thread
stand and clamp	balances
100 g and 200 g weights	small rock
spring balance	pulleys

LEARNING ACTIVITIES

In Item A you studied about work and forces, and we will continue this investigation now. Forces are used to do work, and this can best be accomplished by using machines. A machine is a device which enables us to do work more quickly and easily. A machine can also change energy from one form to another. Without machines, our civilization as we have it today could not exist. However, these complex devices that carry our technology are all made up of combinations and variations of six simple machines, and it is these six machines that you will study now.

(1) Read Practical Modern Physics, from pages 29 to 35, paying particular attention to the diagrams. It will be worthwhile to make some notes and sketches as you go along, as this will help you remember what you read. When you have completed this, read pages 41-56 in Physical Science. Look over the example problems very carefully ---these types of problems are the ones referred to in the Objectives.

(2) Do experiment 12, which is outlined on pages 24 to 26 in Laboratory Experiments.

You are not required to write a formal report for this experiment, but be sure to follow the directions carefully, and do all the required computations and questions. It is only by doing these that you can learn what is required.

(3) Do experiment 13. The instructions for this are on pages 26 and 27 of Laboratory Experiments. Be sure to do the complete assignment.

(4) Do experiment 14 on pages 28 and 29 of Laboratory Experiments. Write your observations, conclusions, and answers to questions in your science notebook.

Experiment 14 is quite a complex assignment, and if your group can complete it successfully, you probably have learned what you should know about levers. If you have problems, look back to experiments 12 and 13, and review the ideas and principles involved.

(5) For your study of pulleys, do experiments 4-4, 4-5, and 4-6, outlined on pages 50 to 54 of Physical Science. Use the apparatus to illustrate the principles involved in these experiments. Write a full report on this series of experiments.

In your report, include a sketch of each combination of pulleys which you used, as well as a description of what you did. Be sure you calculate the mechanical advantage of each system of pulleys. Have your report ready to hand in with the Unit Progress Test.

(6) Turn to page 57 in Physical Science. Do questions 3, 4, 5, 7, 8, 9, 17, and 18 in your notebooks. Discuss them with the other members of your Science group. Now do problems 1 to 6, 10 to 12, on pages 58 and 59. When you have finished, compare your answers with those of others in your group--remember that there is only one correct answer!

When you have finished the reading, the laboratory experiments, questions, and problems for this Item, and checked with your instructor, you probably have met the Objectives. When all this is complete, move on to Item C.

UNIT X: MECHANICS

ITEM C: ENERGY

OBJECTIVES

The student must be able to...

1. Define energy, and differentiate between different kinds of energy.
2. Describe and give examples of the transformation of energy.
3. State the Law of Conservation of Energy, and explain how it applies to the transfer of energy.
4. Explain the relationship between energy and machines.

LEARNING RESOURCES

Books: Physical Science, A Modern Approach

Energy States, Experimentation in Science

Laboratory Experiments in Physical Science

Laboratory Apparatus:
thermometer
test tubes
150 ml beaker
25 ml graduated cylinder
sodium carbonate (anhydrous)
hydrated sodium thiosulfate ("hypo")
dulfuric acid (dilute)
ammonia water

LEARNING ACTIVITIES

Energy, or more precisely, the lack of energy has become a major concern in North America during the last few years. Both the Canadian and American societies require huge amounts of energy in the form of oil, electricity, gas and coal. A shortage of these vital commodities is becoming more apparent, and many economists, geographers, engineers, and other specialists are working to meet the problem. Without a huge continuous input of energy, our society cannot survive in its present form.

In your reading in Item B, you were told briefly about energy and how it relates to work. In this Item we will have a closer look at energy; what it is, and how our knowledge of it is used in our everyday lives.

(1) Read quickly through Energy States. You might recognize this booklet as one you used in your study of Heat, if you took this Unit. Your review will serve to refresh your memory, and add new knowledge of light energy.

(2) Read pages 60 to 68 in Physical Science. Make brief notes as you read. Be sure your notes are related to the Objectives of this Item.

(3) Do the four activities outlined in Experiment 22 on pages 45 and 46 of Laboratory Experiments.

Follow the directions carefully, and discuss the questions asked with the others of your group. No written report is necessary, although you may find it useful to make some notes.

(4) From pages 69 and 70 of Physical Science, do questions 2, 3, 5, 6, 8, 10, and 11. Answer them in your notebook. Discuss them with other members of your group when you have finished.

When you have finished the assignments for this Item and checked them with the instructor, go on to Item D.

UNIT X: MECHANICS

ITEM D: MOTION

OBJECTIVES

The student must be able to...

1. Define the term "motion".
2. Distinguish between rate, speed, velocity, and acceleration.
3. Solve problems involving rate, speed, velocity, and acceleration, given the necessary data.
4. Solve problems involving uniformily accelerated bodies, including freely falling bodies, given the necessary data.
5. State Newton's three Laws of Motion
6. Define momentum, and solve problems involving momentum.

LEARNING RESOURCES

Books: Physical Science, A modern Approach

Practical Modern Physics, Cambridge

Laboratory Experiments in Physical Science

Laboratory apparatus: inclined plane with fixed pulley
Hall's Carriage
weights
weight pan
centimeter ruler
stopwatch

LEARNING ACTIVITIES

If you are sitting in a smoothly running bus, are you moving? You will answer "yes" to this question--but compared to the passenger who is sitting beside you, are you moving? Suppose a fly, which is buzzing around the bus, flies towards the rear of the bus at the same speed that the bus is moving forward. Is the fly moving? We can see that motion is not as simple and straightforward as it might seem to be at first consideration.

In this Item, our final one on this Unit on Mechanics, we will study about motion, the different types of motion, some of the causes of motion, and you will do some experiments dealing with motion.

(1) Read pages 246-253 in Physical Science. The pages here deal with motion, and then go on to the related ideas and computations. When you have finished reading, answer questions-1,2,3,5,8, and 10 from page 253 in your notebook.

(2) Read pages 255 to 262 in Physical Science. Make brief notes on the Laws and formulas which you find during your reading. Now do questions 2,3,4,7,9,10, and 11 on pages 262-263. Compare your answers with those of others in your group.

(3) Do the following experiments with your group. Experiment 52, outlined on pages 103 to 105 of Laboratory Experiments. Then do experiment 53, on pages 105 and 106 of the same book. In each case do not make a graph of the results, but do answer the questions which follow.

(4) Problems. Do all eight problems on page 254 of Physical Science. When you have finished these, do all the problems on page 263. Compare answers with others in your group. If there is agreement among you, your answers are probably correct--if not,try again! Perhaps also, your instructor could help you.

Review. Review this Item by reading pages 61 to 64 in Practical Modern Physics.

This concludes the learning activities for this Item and the entire Unit on Mechanics. If you followed instructions, you did a lot of work and probably learned quite a bit about the various topics discussed. Before attempting this Unit Progress Test however, check all the Objectives for each Item in the Unit. Be sure you can do every type of problem, and make sure you have a clear understanding of the theory involved. Have your experiment report from Item C ready to hand in with your completed Test.

Science Test

UNIT X

Exp. report	___ / 10
Test score	___ / 74
Student score	___/84

Name:_____ ____

Date:_____

Exercise #1: (14) Matching. Match the word or words in the left-hand column with the correct phrase in the right-hand column.

____	1. gravity	a. force that tends to pull objects to the centre of the earth
____	2. energy	b. the amount of matter in a given object
____	3. weight	c. a measure of the earth's attraction for an object
____	4. fission	d. a push or a pull that tends to produce or prevent motion
____	5. mass	e. universal force of attraction between all bodies in the universe
____	6. turbine	f. resistance to motion of moving surfaces in contact
____	7. force	g. resistance to change of motion
____	8. motion	h. energy that may be due to the position of a mass
____	9. inertia	i. the splitting of nuclei to release large amounts of energy
____	10. kinetic energy	j. may be expressed as the ability to do work
____	11. friction	k. may be expressed as change of position of a mass
____	12. potential energy	l. device that changes linear motion to rotary motion
____	13. gravitation	m. energy contained in fuels
____	14. chemical energy	n. energy due to movement

Exercise #2: (20) Fill in the blanks with the word or words that best completes the statement.

1. The product of a force acting through a distance is called _____.

2. The unit of measurement of work in the English system is the _____

_____.

3. One horsepower is equivalent to _____ foot-pounds per second or _____ foot-pounds per minute.
4. If two men do an equal amount of work, but one uses less time, he achieves a greater _____.
5. The law of machines states that _____ on a machine is equal to the _____ of a machine, if we disregard friction.
6. The percentage of work put into a machine that can be taken out as useful work is called the _____ of a machine.
7. With a lever, the distance from the effort to the fulcrum is called the _____.
8. With a lever, the distance from the resistance to the fulcrum is called the _____.
9. The mechanical advantage of a single-fixed pulley is _____.
10. The M.A. of a single-movable pulley that gains force is _____.
11. With a machine such as the inclined plane, we sacrifice _____ in order to gain _____.
12. The M.A. of the inclined plane may be expressed as the _____ of the plane over the _____ of the plane.
13. The diameter of the wheel over the diameter of the axle is an expression of the _____ of a wheel and axle.
14. When the effort is applied to the axle of a wheel and axle, the M.A. of the machine is _____ than one.
15. All of the six simple machines are really modifications of the _____ and the _____.

Exercise #3: (20) Match the word or words in the left-hand column with the correct phrase in the right-hand column. Letters from the right-hand column may be used as often as needed.

_____	1. doorknob	a.	wheel and axle
_____	2. axe head	b.	inclined plane
_____	3. baseball bat	c.	wedge
_____	4. driveway	d.	2nd class lever
_____	5. wheelbarrow	e.	3rd class lever
_____	6. windlass	f.	1st class lever
_____	7. teeter-totter	g.	single-fixed pulley
_____	8. clothesline		
_____	9. egg-beater		
_____	10. nail		
_____	11. staircase		
_____	12. nutcracker		
_____	13. golf club		
_____	14. screwdriver		
_____	15. escalator		
_____	16. broom		
_____	17. sugar tongs		
_____	18. loading ramp		
_____	19. pliers		
_____	20. draw cord		

Exercise #4: (20) Multiple choice. In each of the following, circle the letter preceding the word or phrase that best completes the statement, or answers the question.

1. A compressed spring represents . . .

a) kinetic energy
b) work
c) potential energy
d) power

2. A man exerts a 20-lb. force on the handle of a suitcase and walks a distance of 10 feet while keeping the suitcase at a constant height of 3 feet. How much work was done on the suitcase?

   a) 30 ft-lb.
   b) 200 ft-lb.
   c) 60 ft-lb.
   d) 0 ft-lb.

3. A unit of power might be represented by which of the following?

   a) ft-lb.
   b) ft/sec.
   c) ft-lb/min.
   d) lbs.

4. A man uses a lever having a mechanical advantage of 4 to move a 500-lb. mass. The effort force applied by the man is . . .

   a) increased by 4
   b) reduced by 4
   c) increased by 1/4
   d) reduced by 1/4

5. A machine can never . . .

   a) save time
   b) increase force
   c) save work
   d) transform energy

6. How much force is required to pull a load of 1000 grams up a smooth inclined plane which is 160 centimeters long and 40 centimeters high? (ignore friction)

   a) 6.4 gm.
   b) 25 gm.
   c) 250 gm.
   d) 4000 gm.

7. A system of pulleys was used to lift a 600 lb. weight through 14 ft. The amount of work required to do this was found to be 10,000 ft-lbs. The efficiency of the system was . . .

   a) 84:100
   b) 84%
   c) 8400 ft-lb.
   d) 1600 ft-lb.

8. What force is needed to pull a weight of 64 lbs. up an inclined plane whose length is 12 feet and height 3 feet. The effeciency is 80%, due to friction losses.

   a) 16 lb.
   b) 20 lb.
   c) 51.2 lb.
   d) 192 lb.

9. How much power is required when a force of 60 lb. is needed to push a crate along a 25 foot deck in 15 seconds?

   a) 36 ft-lb/sec.
   b) 100 ft-lb.
   c) 100 ft-lb/sec.
   d) 1500 ft-lb.

10. Which of the following units represents a measure of acceleration?

    a) miles per hour
    b) feet per second
    c) feet per second per second
    d) foot-pounds

11. All objects will fall at the same rate if they . . .

    a) are dropped from a great height
    b) are in a vacuum
    c) have the same weight
    d) have the same mass

12. If a car travelling 30 miles per hour accelerated to 60 miles per hour in 2 seconds, its rate of acceleration would be . . .

    a) 30 mi/hr
    b) 45 mi/hr/sec
    c) 35 mph
    d) 15 mph/sec

13. Two men are required to apply a total effort of 120 lbs. for 5 seconds to move a 300 lb. crate up a loading ramp which is 20 feet long and 4 feet high. What is the input power?

    a) 0.44 hp
    b) 0.55 hp
    c) 0.87 hp
    d) 1.15 hp

14. In the problem in question 13, what is the output power?

a) 0.44 hp
b) 0.55 hp
c) 0.87 hp
d) 1.15 hp

15. Any object at rest possesses . . .

a) momentum
b) kinetic energy
c) inertia
d) acceleration

16. The rate at which an object moves in a given direction is called . . .

a) speed
b) motion
c) acceleration
d) velocity

17. In an experiment, students placed a meter stick on its fulcrum at the 50 cm. mark. A 500 gm. weight was placed on the 35 mm. mark, and the stick was balanced by placing a weight at the 100 cm. mark. How much weight was used?

a) 100 gm.
b) 150 gm.
c) 200 gm.
d) 250 gm.

18. In a system of pulleys . . .

a) the mechanical advantage is equal to the number of supporting ropes.
b) whatever is gained in force is lost in distance.
c) whatever is gained in force is lost in speed.
d) each of these statements (a,b, & c) is true.

19. A wheelbarrow with a 180 lb. load of sand, centered 2½ feet from the wheel, is wheeled for 60 feet in 10 seconds. The handles of the wheelbarrow are 5 feet long. How much torque must be applied to the handles to lift the wheelbarrow legs off the ground?

a) 45 ft-lb/sec.
b) 90 lb.
c) 180 lb.
d) 600 ft-lb.

20. The recoil of a gun is an example of . . .

a) Newton's Third Law of Motion
b) Newton's Second Law of Motion
c) Newton's First Law of Motion
d) a combination of all of the above

UNIT XI: GASES

ITEM A: PROPERTIES OF GASES

OBJECTIVES

The student must be able to...

1. Compare and contrast the physical properties of gases, liquids, and solids.
2. Explain the Kinetic Theory of Gases
3. Explain gas pressure in terms of the Kinetic Molecular Theory.
4. Compute pressure exerted by a gas in a cylinder, given the necessary data.
5. State some applications of air pressure.

LEARNING RESOURCES

Book: Physical Science, A Modern Approach

Laboratory Apparatus: stand and clamp
large glass tube
two 1-hole stoppers for tube
ammonium chloride
hydrochloric acid
glass tubing
250 ml beaker
500 ml flask with 2-hole stopper
rubber tubing
pinch clamp

LEARNING ACTIVITIES

In this Item you will study about gases, and compare them to liquids and solids. In the second Item in this Unit you will make two gases--Hydrogen and Oxygen--and you will learn more about them, and how man uses them.

(1) Read pages 70-73 in Physical Science, stopping when you reach the section beginning "Gas Pressure". Do the experiment described on page 71 of the book. (Exp. 6-2). Set it up carefully as described, and wait until you can observe the results (begin Assignment (2) as you wait...). You can use ammonium hydroxide instead of the "concentrated ammonia water" that is suggested. Be very careful with this substance and with the hydrochloric acid. Both can cause severe burns! Ask your instructor if you are in doubt about any of the procedures. Write up the experiment in the prescribed manner in your notebooks, noting . .

Purpose: (what you are looking for, or proving.)
Apparatus and Materials: (what you are using.)
Procedure: (a description of what you did.)
Observations: (a description of what happened.)
Conclusions: (a scientific explanation of why something happened ...explains the Purpose.)

(2) Read pages 73-78 carefully. When you have done this, do experiment 6-4 as described on page 73. Write your report as outlined above, and show it to your instructor.

(3) Read pages 78 and 79. Now do the series of procedures outlined as experiment 6-7. Follow these procedures very carefully and you will see some surprising things! Write out a report on this experiment, recording each of your Observations carefully, and in your Conclusions describe why these things happened.

On page 81, near the bottom of the page under the heading of "Experiments" is an interesting little demonstration called "Air exerts an upward pressure". Find a glass tumbler and a piece of heavy paper and try what it suggests - - quite surprising isn't it? Try it with half a glass of water. Explain the results . . .

(4) On pages 81-82, do questions 1, 2, 3, 4, 7, 8, 9.

(5) On page 82, do problems 1, 2, 3, 7.

Write out your answers to these problems carefully. A knowledge of these things is required for training in many vocations such as welding, plumbing and so on.

UNIT XI: GASES

ITEM B: OXYGEN AND HYDROGEN

OBJECTIVES

The Student will be able to . . .

1. Identify the main components of air.
2. Demonstrate a method for the chemical production of oxygen.
3. List and demonstrate some of the properties of oxygen.
4. Describe the different types of oxidation.
5. State several uses of oxygen.
6. Describe the principle properties of Hydrogen.
7. Demonstrate a method for the production of Hydrogen.
8. Describe the difference between an element and a compound.

LEARNING RESOURCES

Book: Physical Science, A Modern Approach

Laboratory Apparatus:
- stand and clamp
- pneumatic tank
- collecting bottles
- test tubes
- glass and rubber tubing
- burner
- potassium chlorate
- manganese dioxide
- thistle tube
- zinc metal
- sulfuric acid (dilute)

LEARNING PROCEDURES

Hydrogen and Oxygen are very interesting substances. These gases were used as fuel for the Apollo rockets to propel American astronauts to the moon. Oxygen is required by all living things, and few organisms will live long without it. Hydrogen is the lightest substance on earth, yet it is highly explosive. Both oxygen and hydrogen are used extensively in steel mills and other manufacturing industries. To learn more about these rather special substances, do the following:

(1) Read pages 136-144 in Physical Science. This will answer some of the problems stated in the objectives (opposite). Write brief notes or descriptions of the following: catalyst, metal and non metal, atom, oxide. Do experiment 11-4 outlined on pages 139-140. Be sure you have read 11-2 and 11-3 before you proceed with 11-4! Test your gas to be sure it is oxygen. Write a report on this experiment in the prescribed manner, and show it to your instructor when you have finished.

(2) Read pages 147-150. This will give you a description of Hydrogen, and some of it's properties and uses. Do experiment 12-2, following directions carefully. Remember, both the acid and hydrogen can be dangerous if not handled properly. Write a report describing this experiment.

There is a demonstration which you can do which will show that the atmosphere is about one-fifth oxygen. Place some water in a shallow dish, then stand a candle in the dish. Light the candle and place a jar (upside down) over the candle, so that the mouth of the jar is beneath the surface of the water. Two things will happen - explain each. How does this prove that air is about one-fifth oxygen? Do it several times if you don't quite see what happens the first time, only be sure to get "fresh" air into the jar each time. When your group is satisfied that you have a good scientific explanation for what you see, call the instructor and tell him . . .

(3) On pages 145-146, do questions 1, 2, 8, 10, 11, 13, 18, 19, and 20.

(4) From pages 155-156, do questions 1, 2, 5, and 7.

Now review the Objectives for this Unit. If you are able to meet them you are ready for the Unit Progress Test. Have your five written reports ready to hand in with your completed test.

Science Test

UNIT XI

Name:_____

Lab reports ___/25
Test score ___/35

Student score ___/60

Date:_____

Exercise 1. (12) Matching. Match the word on the left with the sentence on the right by placing the number of the word in the space beside the sentence which best describes the word.

1. exothermic	____	always fills the container.
2. oxidation	____	force exerted on a unit surface area
3. gas	____	formed by two elements combining chemically with each other.
4. molecule	____	a chemical reaction which requires heating before it will start.
5. atom	____	fixed size and shape
6. catalyst	____	an instrument used to measure atmospheric pressure.
7. endothermic	____	cannot be broken down into simpler substances.
8. liquid	____	a substance which speeds up a chemical reaction.
9. pressure	____	smallest part of a substance which can take part in a chemical reaction.
10. compound	____	assumes the shape of its container, but may not fill it.
11. chemical	____	chemical reactions which give off heat.
12. barometer	____	a basic part of matter which is always in motion.
13. solid		
14. element		

EXERCISE 2. (23) Completion. In the space provided, write the word or words which best complete the sentence.

1. The kinetic Theory of Gases states that gas molecules behave in four specific ways. These are...

(1)_____

(2)_____

(3)_____

(4)_____

2. Oxygen is produced by heating _____ and using _____ as a catalyst.

3. Hydrogen has two notable properties, _____ and _____, and it is always found in compounds used as _____.

4. Molecules of a gas are always _____. If they are crowded into a smaller space, they strike their container _____ _____ and build up _____.

5. The main components of air are _____ and _____.

6. There are two types of oxidation reactions: one is _____ with _____ as an example, and the other is _____ with _____ as an example.

7. If a gas compressed in a cylinder exerts a force of 10,000 grams on a piston whose surface area is 150 square centimeters, the pressure on the piston is _____.

8. Hydrogen was made experimentally in the lab. by the action of _____ _____ on _____.

9. If a gas in a cylinder is heated, the pressure _____ because the molecules _____.

UNIT XII: WATER & HYDRAULICS

ITEM A: WATER

OBJECTIVES

The student must be able to...

1. List the principal properties of water.
2. Describe the chemical composition of water.
3. Define the terms: solubility
   vapor pressure
   condensation
   evaporation

LEARNING RESOURCES

Book: Physical Science, A Modern Approach

Notes: included in this Item

Laboratory apparatus: balances
pneumatic trough
1000 ml flask
1 hole stopper
glass tubing
test tubes
potassium nitrate
thermometer
250 ml beaker

LEARNING ACTIVITIES

In this Unit you will study about water--its physical and chemical properties--and how man is able to use his knowledge of water to utilize it in many ways.

(1) Read pages 118-120 (top) in Physical Science. Note especially the "unusual behavior of water" described here. What is so unusual? Do experiment 9-4 as directed on page 118. In your notebooks answer the following: (1) Why did the column of water in the tube fall slightly as you began to heat the flask? (2) Why did the water rise in the tube? (3) What is meant by "coeficient of expansion?"

(2) Read pages 152-155 in Physical Science. This section discusses the chemical properties of water. To investigate solubility further, do experiment 12-6 on page 152. Use a thermometer and balances to check the data given on the solubility of potassium nitrate on pages 152-153. Are your results exactly the same? Write a report on this experiment and tabulate your observations on temperature and amount of solid dissolved. What are your conclusions? Hand in this report with your Unit Test.

(3) To investigate the composition of water, do experiment 12-7 on page 153. You will produce a gas that will prove to be hydrogen...but water also contains oxygen--what happened to it?

(4) Read the notes on water which begin near the bottom of this page. Pay special attention to the underlined words.

When you have completed the above, you should be able to meet the objectives of this Item. Check them to make sure, and discuss them with the others in your group before moving on to Item B.

WATER

Molecules in liquids are closer together than they are in gases. In order to change a gas into a liquid, we must make the molecules come closer together. Frequently all that is needed is to increase the pressure and to remove the heat produced. Usually, however, the temperature is lowered and pressure kept at atmospheric pressure. By using high pressure and low temperature, all known gases have been changed to liquids, and even to solids.

An illustration of the fact that the molecules are farther apart in a gas than in a liquid is that 1 ml of water becomes 1700 ml of steam, even though both are at the same pressure, 760 mm. and temperature, 100°C. We explain this change by saying that the water molecules are farther apart in steam than they are in liquid water.

What gives substances their shape?

When molecules are close together, a force that pulls them together, an attractive force, can be noticed. For example, watch a drop of water fall from a faucet. Notice that the water takes the shape resembling a sphere, because the molecules of water pull one another together. This pull causes water to take the form that has the smallest surface for a given volume, a sphere. Mercury droplets show this effect even more strikingly than water droplets.

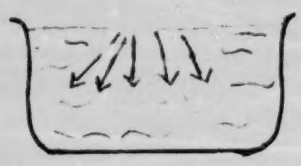
The forces that hold the molecules together in a liquid are not strong enough to keep it from flowing. In a solid, the molecules are held together even more firmly. This is why solids take on a more or less rigid structure.

An oil film on water shows this cohesion (attraction) of oil melecules for one another. The oil spreads until it sometimes becomes 1 molecule thick. Then it stops spreading because of the cohesive force between the oil molecules.

A gas may be compressed easily; but pressure can change the volume of a liquid only slightly. A gas expands when heated; but, as a rule, a heated liquid changes in size much less than a gas, and a solid still less. A liquid tends to evaporate (become a vapor or a gas) at its free surface. Some solids, even snow, evaporate, but much more slowly than liquids.

CONDENSATION: Steam readily changes to water. The changing of any gas to a liquid is called condensation. This is a physical change; It is the opposite of evaporation. When a gas or vapor is cooled enough, the gas becomes liquid. The molecules move less rapidly when the gas is cooled. The attracting force, or the cohesion of one molecule for another, becomes strong enough for them to form a liquid.

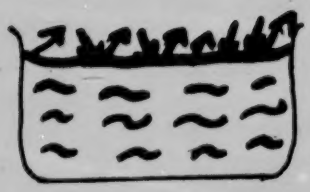
EVAPORATION: The molecules in the layer on the surface of a liquid are different from the molecules elsewhere in the liquid. Within the liquid, all the molecules have the attracting force of their neighbors, which is equal in all directions. On the surface, there is no cohesive force acting on the molecules from above. A film is formed on the surface of water, because this outer layer of molecules has only downward cohesive forces acting on it.



This layer of surface molecules on water is strong enough to float a razor blade or needle.

At the surface of a liquid, some of the especially energetic molecules are moving fast enough to "take-off" into space above. But how can the molecules of the liquid escape into the space above, if that space is already filled with air? Obviously, any space that contains air is far from "filled". Plenty of room is left betwen the molecules in the air for the molecules that come from the liquid. Thus the space above a liquid contains both air molecules and molecules of the vapor of the liquid.

This escape of molecules at the surface of a liquid to form a vapor is called evaporation.



The rate of evaporation is more rapid when the temperature rises. Molecules of the liquid move faster when the liquid is heated, and thus more molecules have enough energy to leave the liquid.

Fanning a liquid or blowing a draft of air over it also hastens the rate of evaporation.

As you have seen, there are molecules from the liquid above the surface of every liquid. These are constantly moving about so that they hit one another. Some of them hit the liquid again. Then they are close enough to the molecules of the liquid to allow the force of cohesion to act. They stay with the liquid. If, instead, a draft of air takes these vapor molecules away, they cannot reach the liquid. The liquid cools because the molecules, moving away from the surface, take excess energy along with them. They are moving faster than the average velocity at that temperature. Hence, the average velocity at that temperature. Hence the average velocity of the remaining molecules is less, and the temperature of the remaining liquid is lower.

Why do clothes dry better on a windy day? Why are damp clothes cooler than dry clothes hanging on the same line?

VAPOR PRESSURE: A balance of molecular action, or equilibrium, is illustrated by the actions at the surface of gasoline in a partly filled closed tank. The air in the space above the gasoline is saturated (filled to the limit at that temperature) with gasoline vapor. The gasoline vapor is continually forming liquid gasoline again and just as rapidly evaporating. This equilibrium also occurs when evaporation of any liquid goes on in an enclosed space at a constant temperature. The vapor and the liquid have the same temperature. The rate at which molecules leave and return to the surface becomes the same. These two actions are equal in rate but exactly opposite in their effect. The vapor molecules from a liquid exert a continual, unchanging pressure, called <u>vapor pressure</u>, under the conditions described. Vapor pressure is defined as the pressure (at any temperature) of the vapor molecules in equilibrium with the liquid. It increases as the temperature is raised.

UNIT XII: WATER & HYDRAULICS

ITEM B: HYDRAULICS

OBJECTIVES

The student must be able to...

1. State the relationship between depth, density, and pressure of a liquid in words, and as a mathematical equation.
2. State Pascal's Law, and solve related problems in hydraulics
3. State Archimedes' Principle, and solve related buoyancy problems.
4. Define 'specific gravity' and solve problems related to this concept.

LEARNING RESOURCES

Books: Practical Modern Physics, Cambridge

Physical Science, A Modern Approach

Laboratory apparatus:
1 gallon can
matchsticks
overflow can
beaker
balances
spring balance
small rock
string

LEARNING ACTIVITIES

In Item A of this Unit you studied about water, and learned something about its physical and chemical properties. This type of study is called Chemistry. However, in Item B we will look at some of the applications of man's knowledge of water and other fluids. This type of science study is called Physics. You will learn how some common machines, like the hydraulic jack, work, and will be able to understand and explain scientifically some common occurrences, for example, why some things float and others sink . . .

(1) Read pages 41-45 in the Practical Modern Physics workbook carefully. When you have finished this answer questions 14 and 15 (on page 48) in your notebook.

(2) Read pages 84-95 in Physical Science. Study these pages carefully, and examine the diagrams. Then do questions 1, 3, 10, and 20 on pages 96 and 97.

(3) Do experiment I-Pressure in Liquids, outlined on Page 45 of Practical Modern Physics. The report is partially done for you in the book. Copy it into your notebooks, but describe what you did in the procedure and complete the observations and conclusions.

(4) Do experiment 7-5 on pages 92-93 in Physical Science. Make your observations and draw your conclusions.

(5) Turn to page 51 in Practical Modern Physics and read through to the end of paragraph 4 on page 53. Now do experiment II - Determining the Specific Gravity of a Solid Denser than Water - outlined on pages 55-56.

(6) Problems. Do problems 1,2,3,4,5,9,10,13, and 16 on pages 97-98 in Physical Science.

When you have finished the above assignments - that is, done the questions and problems; completed the experiments and had the instructor check the reports - review your work from Item , check all your objectives, and write the Unit XII Progress Test. Have your lab report (Item A, assignment 2) ready to hand in with your completed test.

Science Test

UNIT XII

Lab report ___/10	Name:_____
Test score ___/29	
Student score ___/39	Date:_____

Exercise 1. (12) Matching. Match the word on the left with the sentence on the right by placing the number of the word in the space beside the sentence which best describes the word.

1. solubility	___the changing of a gas to a liquid
2. specific gravity	___the pressure of vapor molecules in equilibrium with a liquid.
3. snowshoes	___one gram per cubic centimeter
4. density of water	___the amount of substance that will dissolve in 100 g of water at a given temperature.
5. pressure	___a device to measure the specific gravity of liquids
6. hydrometer	___force per unit area
7. vapor pressure	___two parts hydrogen combined with one part of oxygen
8. water	___objects whose density is less than water
9. condensation	___the tendancy of molecules to leave a liquid and to form a gas
10. will float	___transfer force by means of liquids
11. hydraulic machines	___the ratio of the weight of a substance and the weight of an equal volume of water.
12. density	___reduces pressure by distributing weight over a larger area
13. evaporation	
14. will sink	

Exercise 2. Multiple choice. In each of the following, circle the letter preceeding the word or phrase that best completes the statment or answers the question.

1. Which of the following units should be used to express density?
   a) grams
   b) pounds per square foot
   c) foot-pounds
   d) grams per cubic centimeter

2. Which of the following will not affect pressure in a tank of liquid?
   a) a change in depth
   b) a change in volume but not height
   c) a change in area
   d) a change in density

3. The boiling point of water is...
   a) 0^{o} C.
   b) 32^{o} C.
   c) 100^{o} C.
   d) 212^{o} C.

4. The force on a vertical surface exerted by a liquid is equal to...
   a) $\frac{\text{height x density x area}}{2}$
   b) $\frac{\text{force}}{\text{area}}$
   c) $\frac{\text{density x pressure}}{2}$
   d) pressure x area

5. An aquarium 2 ft. long, 3 ft. high, and 1 ft. wide is filled to the top with water. How much pressure is exerted on the bottom of the aquarium? (Water weighs 62.4 lbs per cubic foot.)
   a) 561.6 lb. per square foot
   b) 187.2 lb. per square foot
   c) 62.4 lb. per square foot.
   d) none of the above.

6. An object is submerged 2 feet below the surface of a pond. The pressure exerted on this object is...
   a) greater from above
   b) greater from below
   c) equal in all directions
   d) none of the suggested answers

7. The total force exerted by a liquid is equal to...
   a) $\frac{\text{height x density x area}}{2}$
   b) $\frac{\text{force}}{\text{area}}$
   c) $\frac{\text{density x pressure}}{2}$
   d) pressure x area

8. The fact that a B. C. ferry, loaded with automobiles, will float is explained by...
   a) the density of liquids
   b) Pascal's Law
   c) the law of gravity
   d) Archimedes' Principle

9. The freezing point of water is...
   a) 0^{o} C.
   b) 32^{o} C.
   c) 100^{o} C.
   d) 212^{o} C.

10. A metal block 2 ft. by 4 ft by 6 in. weighs 520 lbs. Its density is...
    a) 10.8 lbs/cu ft.
    b) 130 lbs/ cu ft.
    c) 24,960 lbs/cu ft.
    d) 2080 lbs/cu ft

11. Water has a density of...
    a) 1 gm/cu cm
    b) 62.4 gm/cu ft
    c) 1.29 gm/liter
    d) 13.6 gm/cu cm

12. The pressure exerted by a liquid is equal to...
    a) $\frac{\text{height x density x area}}{2}$
    b) $\frac{\text{force}}{\text{area}}$
    c) $\frac{\text{density x pressure}}{2}$
    d) pressure x area

13. If an object weighs 124 gm in air and displaces 80 ml of water when submerged, its specific gravity is...
    a) 9920
    b) 1.55
    c) 15.5
    d) none of these choices

14. An instrument used to measure small pressures is called a...
    a) thermometer
    b) barometer
    c) hydrometer
    d) manometer

15. The operation of a hydraulic lift is explained by...
    a) the density of liquids
    b) Pascal's Law
    c) the law of gravity
    d) Archimedes' Principle

16. The small piston of a hydraulic jack has an area of 2 sq. in., while the large piston in 20 sq. in. If a person using the jack exerts 60 lb/sq. in. on the small piston, how much upward force will he create on the large one?
    a) 1200 lbs
    b) 60 lb/sq in.
    c) 120 lb/sq in.
    d) 2400 lbs

17. The mechanical advantage of the hydraulic press in question 16 is...
    a) 10
    b) 20
    c) 40
    d) 60

UNIT XIII: HEAT

ITEM A: HEAT & TEMPERATURE

OBJECTIVES

The student must be able to...

1. Distinguish between heat and temperature.
2. Compare Fahrenheit and Centigrade temperature scales
3. Explain the structure and operation of a thermometer.
4. Measure heat and solve problems involving heat exchange.
5. Define Specific Heat and solve problems involving specific heat.

LEARNING RESOURCES

Books: Physical Science, A Modern Approach

Energy States, Experimentation in Science

Laboratory Experiments in Physical Science'

Laboratory apparatus: burner
graduated cylinder
two 8 oz styrofoam cups
thermometer
metal washers
balances
white gasoline
aluminum calorimeter

LEARNING ACTIVITIES

Cold is defined as the absence of heat. When no heat at all is present in a substance, its temperature is 459.67 degrees below zero (F)! Heat, or the lack of it, does strange things to substances--solids become liquid; gases turn to solids; or solids turn to gases! Unit XIII deals with the study of heat. In this Item you will study heat and temperature; in Item B the effects of heat; and in Item C, heat transfer. To help you learn about heat, you will be doing some reading, performing a number of experiments, and doing some applied problems.

(1) Read pages 93-111 in Energy States. Note especially the photos and diagrams. Following this, read the notes included in this Item. Near the end are some questions dealing with heat measurement. Answer these in your notebooks.

MEASUREMENT OF HEAT: A thermometer tells the temperature at the spot where it is located, but it does not tell how much material is heated to that temperature. In order to measure the amount of heat, the amount of material must be included with the temperature.

The standard amound of material for heat measurements in the laboratory is 1 gram of water. When the temperature of 1 g of water is changed 1 C, 1 cal of heat is required. This is called the specific heat of water. To heat 1 g of water 10°C requires 10 cal; to heat 10 g of water 10°C requires 100 cal.

The calory is the unit used to express the energy change that accompanies a change of state. It is also the unit used to measure the heat given off when fuels burn and the heat absorbed or liberated in chemical actions generally.

QUESTIONS:

1. How many calories are needed to heat 20g of water from 30 C to 40 C? From 10 C to 40 C.

2. How many calories are needed to heat 150 g of water from 30 C to 65 C?

Amount of heat in Change of State

When ice melts, the water remains at the temperature of its melting point, which is 0°C, until all the ice has melted. Adding more heat hastens the melting but will not raise the temperature until all the ice has melted. The molecules of ice at 0 C and of water at 0 C move with the same average velocity. After all the ice has melted, the temperature of the water rises. The molecules move more rapidly. Water absorbs 1 cal/g/ C until it reaches its boiling point, 100 C. Now the water boils. Supplying more heat hastens the boiling but does not raise the temperature while any water is left. Molecules in the liquid and vapor are now moving with the same average velocity.

To change 1 g of ice to 1 g of water, both ice and water staying at 0 C, 80 cal is necessary. The amount of heat required to change 1 g of a solid to 1 g of liquid without raising the temperature is called the heat of fusion. The heat of fusion of water is 80 cal.

The number of calories needed to change 1 g of a liquid to 1 g of a gas of the same substance at the same temperature is called the heat of vaporization. The heat of vaporization is 540 cal.

QUESTIONS:

1. How many calories are needed to change 7 g of ice and to change the resulting ice water to 20 g?

2. How many calories are needed to change 8 g of water at 20 C to 100 C and to boil away the resulting hot water?

3. How many calories are needed to change 20 g of ice at 0 C to steam at 100 C?

4. Distinguish between calorie, degree, and specific heat.

5. List 4 factors that change the rate of evaporation.

6. Water on a stove in an open pan is boiling gently. The heat is suddenly increased. What is the effect.
   a) On the temperature of the water?
   b) On the rate of boiling?

7. The pugent odor from an open bottle of household ammonia can soon be smelled anywhere in a room. Explain.

(2) Read pages 100-110 in Physical Science carefully. Following this, do these experiments: (a) Experiment 24 outlined on pages 49-50 of Laboratory Experiments. Follow the directions, and carefully tabulate the results in your science notebooks. (b) Experiment 25, on pages 51 and 52 of Laboratory Experiments. You may have to bring a few iron washers from home for this experiment.

Follow the procedures carefully, and record your observations as they occur. What are your conclusions regarding the specific heat of the washers? Write a full report on this experiment--including calculations--and have it ready to hand in with your Unit Progress Test.

(3) Turn to page 110 in Physical Science, and do questions 1,7,8,9,10,11, 12,13,15,21,23, and 24 in your notebook. When you have completed this, do the following problems on pages 111-112: Nos. 2, 3, 7, 8, 9, 12, 13, 14, and 15.

As you do the problems, compare your answers with those of others in your group, and if you have mutual problems, see your instructor. When you have completed this Item, you will know quite a bit more about heat than when you started. However, there are other aspects of heat which we have yet to study. For these, go on to Item B.

UNIT XIII: HEAT

ITEM B: EFFECTS OF HEAT

OBJECTIVES

The student must be able to:

1. Explain why substances expand or contract in reaction to heat.
2. Describe the relationship between pressure and temperature.
3. Explain the process of distillation
4. Define the term 'Coefficient of expansion'.
5. Solve problems involving changes in size and coefficient of expansion, given the necessary data.

LEARNING RESOURCES

Books: Physical Science A Modern Approach

Energy States, Experimentation in Science

Laboratory apparatus:
- ball & ring apparatus
- bimetal strip
- ring stand and ring
- large flask with 1-hole stopper
- thermometer
- burner

LEARNING ACTIVITIES

Have you ever been in an industrial plant such as a refinery, where pipe lines are running along the surface of the ground? Did you wonder about the loops which had been built into these lines? Have you ever noticed and thought about the "zippers" which are always built into long bridges? Why are "cracks" built into sidewalks every six feet or so? All of these things are necessary because of one factor--change in temperature. In this Item we will have a look at what change in temperature does to different substances.

(1) Read pages 113 to 121 in Physical Science. Pay special attention to the problems on page 117. You will recognize some of the ideas found on pages 118 and 119--these were discussed earlier in this Unit.

(2) The effects of heat on solids: Do experiment 9-1 and 9-2, outlined on pages 114 and 115 of Physical Science. Discuss the results. How are these ideas applied in industry?

Read pages 48 to 58 in Energy States. Much of this will be a review for you, nevertheless it is still important. From pages 55 to 58 the relationship of pressure and temperature is discussed--a pressure cooker and a refrigerator are described as proctical applications of this knowledge. You should know how and why each one works as it does.

(3) Do the following experiment: Procure a large flask with a one-hole stopper into which a thermometer fits snugly. Heat about 100 ml. of water to boiling in the flask, mounted on a ring stand. Now remove the heat and put the stopper with the thermometer into the flask. Tilt the flask onto its side. (far enough so the thermometer is beneath the surface of the water)
Pour some cool water over the flask. Observe what happens. Cool the flask further. Record the lowest temperature at which you can make the water boil.

(4) In Physical Science, on pages 121-122, there are some questions and problems. Do the following: questions 1, 5, 7, 15, 18, and 21. Problems 1, 3, 5, and 6.

Be sure to complete the above experiments and questions in this Item. Discuss any difficulties with your group and your instructor. When you have met the Objectives, go on to the rest of the Unit.

UNIT XIII: HEAT

ITEM C: HEAT TRANSFER

OBJECTIVES

The student must be able to:

1. Explain and give examples of heat conduction.
2. Explain and give examples of heat convection.
3. Explain and give examples of heat radiation.
4. Define and describe the use of insulators.
5. Identify some factors affecting heat absorption.

LEARNING RESOURCES

Books: Physical Science, A modern Approach

Energy States, Experimentation in Science.

Laboratory Experiments in Physical Science

Laboratory Apparatus:
- aluminum calorimeter
- four thermometers
- thermos bottle
- metal cup
- styrofoam cup
- test tubes
- burner
- 500 ml beaker

LEARNING ACTIVITIES

All heat on earth originates from the sun, yet the sun is separated from earth by 93 million miles of cold lifeless space. How then, does the heat get here? This and other questions regarding the transfer of heat will be considered in this Item. We will find that man has learned many things about heat transfer, and that heat can be transferred very efficiently, or prevented from being transferred, if necessary.

Read pages 59 to 64 in Energy States. These readings will give you an overview of some of the theory and applications of heat transfer and heat insulation.

(1) Heat transfer: Do experiment 23 in Laboratory Experiments. In addition to the apparatus from the lab supplies, one of your group will have to bring a thermos bottle and a metal cup for this experiment. Follow the directions carefully. Make a table of the results in your science notebooks, but you are not required to make a graph.

Study pages 124 to 132 in Physical Science, noting especially the examples of heat transfer that occur in the natural world (causing winds, etc...)

(2) Heat radiation: Do experiment 2, outlined at the bottom of page 132 in Physical Science. If the sun is not shining place the two test tubes equidistant from the burner for 20 minutes or so. Discuss your observations

(3) Turn to page 133 in Physical Science. Do questions 8, 10, 12, 13, and 14.

Write your answers in your notebook, and arrange to meet with your group to discuss them, and any other difficulties you may have had with this Unit. Review the Objectives for the three Items, and be sure you know all the related scientific facts and ideas. When your group is ready, you should write the Progress Test for this Unit. Be sure to have your lab report from Item A, assignment 2 ready to hand in with your completed test.

Science Test

UNIT XIII

Test Score	__/ 40
Lab report	__/ 10
Total score	___/50

Name_____ ___ _____

Date_____

Exercise 1: Matching. Match the word on the left with the sentence on the right by plaing the number of the word in the space beside the sentence which best describes or defines that word.
(19)

1. heat	___temperature at which a liquid changes to a gas.
2. temperature	___temperature scale on which water boils at 212°.
3. B.T.U.	___change in unit length per degree rise in temperature.
4. centigrade	___unit of heat quantity in the metric system.
5. freezing point	___form of energy due to motion of molecules.
6. conduction	___temperature at which a liquid changes to a solid.
7. radiation	___temperature scale on which water is most dense at 4°.
8. conductor	___Unit of heat quantity in the English system.
9. radiator	___the degree of heat (or cold) of a substance
10. expansion	___calories required to raise 1 g of a substance through one degree C.
11. calorie	___a distant source of heat.
12. fahrenheit	___loss is size of a substance without a loss of weight.
13. boiling point	___silver surfaces of a thermos bottle is an example.
14. specific heat	___heat transfer by wave or ray motion.
15. convection	___gain in size of a substance without an increase in weight.
16. insulator	___substance that does not conduct heat readily.
17. reflector	___heat transfer by molecular collision.
18. distillation	___substance that readily transfers heat along itself.
19. contraction	___heat transfer by the natural motion of fluids or gases.
20. coefficient of expansion	

Exercise 2: Multiple choice. In each of the following, circle the letter preceeding the word or ohrase which best completes the statement or answers the question.
(21)

1. When the temperature of water drops from 4^{o} C to 0^{o} C, the water...
   a) freezes
   b) contracts
   c) remains the same
   d) expands

2. Heat is released when...
   a) water vapor condenses
   b) a liquid evaporates
   c) a solid melts
   d) a liquid boils

3. The quantity of heat needed to raise the temperature of one pound of water through 1 degree F. is...
   a) a calorie
   b) a BTU
   c) 10 calories
   d) 10 BTU 's

4. 23^{o} F. is equivalent to...
   a) -5^{o} C.
   b) 74.3^{o} C
   c) 5^{o} C
   d) -10^{o} C.

5. Heat energy reaches the earth from the sun by a process called...
   a) conduction
   b) radiation
   c) insulation
   d) convection

6. Convection takes place because...
   a) air contains moisture
   b) moist air is heavier than dry air
   c) the action of the wind.
   d) cool air is heavier than warm air

7. The vacuum in a thermos bottle prevents heat from being lost by...
   a) convection
   b) radiation
   c) conduction
   d) both (a) and (c)

8. A hot-air duct type heating system transfers heat by...
   a) convection
   b) radiation
   c) conduction
   d) both (a) and (c)

9. Good reflectors...
   a) are usually dark in colour.
   b) make good radiators
   c) are usually light in colours
   d) make good absorbers

10. The metal heating coil of a toaster weighs 5 grams and has a specific heat of .10. How much heat is required to raise the temperature of the coil from 20^{o} C to 600^{o} C?
   a) 290 calories
   b) 310 calories
   c) 600 calories
   d) 3000 calories

11. A device that is used to regulate temperatures is called a(n)...
   a) barometer
   b) thermometer
   c) thermostat
   d) calorimeter

12. The amount of heat needed to raise the temperature of 100 g of water through 1^{o} C is...
   a) one calorie
   b) one BTU
   c) 100 BTU 's
   d) none of the above

13. A form of energy produced by the destruction of matter is called...
   a) mechanical energy
   b) kinetic energy
   c) heat energy
   d) chemical energy

14. A metal rod 100 cm. long was heated from 10^{o} C to 70^{o} C and was found to expand .126 cm. The coefficient of linear expansion of this metal is...
   a) .00756
   b) .00018
   c) .000021
   d) .0000201

15. The ability of objects to absorb heat depends on...
   a) the weight
   b) the colour
   c) the source of heat
   d) both (a) and (c)

16. -10^{o} C is equal to...
   a) 23^{o} F.
   b) 50^{o} F.
   c) -23.3^{o} F.
   d) 14^{o} F.

17. In a compound bar made of brass and iron...
    a) the iron expands more rapidly than brass when heated.
    b) the iron contracts more rapidly than brass when cooled.
    c) they both expand at the same rate.
    d) none of the above.

18. One degree on the Centigrade scale is equal to...
    a) one degree on the Fahrenheit scale.
    b) 9/5 of a degree on the Fahrenheit scale.
    c) 5/9 of a degree on the Fahrenheit scale.
    d) 3.2 degrees on the Fahrenheit scale.

19. When water freezes, it...
    a) contracts
    b) expands
    c) loses weight
    d) both (a) and (c)

20. The amount of heat needed to change 25 lb. of water from its freezing point to its boiling point is...
    a) 2500 BTU
    b) 2500 calories
    c) 4500 BTU
    d) 4500 calories

21. The steel centre section of the Port Mann Bridge is 600 feet long. What is the change in length of this section from a winter temperature of -15^{o} C to a summer temperature of 55^{o} C? (The coefficient of linear expansion of steel is 0.000010).
    a) .24 feet
    b) .42 feet
    c) 2.4 feet
    d) 4.2 feet

Science

UNIT XIV: ELECTRICITY

UNIT A: MAGNETISM

OBJECTIVES

The student must be able to...

1. Define the term 'magnet'.
2. Describe and illustrate various fields of force caused by magnets placed in different combinations.
3. Illustrate and explain the causes and effects of magnetic induction.
4. Outline some theories which attempt to explain the nature of magnetism.

LEARNING RESOURCES

Book: Electricity and Magnetism, Case Histories in Science

Laboratory Experiments in Physical Science

Laboratory Apparatus: 2 bar magnets
small compass
non-magnetic weights

LEARNING ACTIVITIES

The effects of magnetism were first observed when fragments of iron are called lodestone, found in nature, were seen to attract other pieces of iron.

It was further discovered that a long piece of this iron ore suspended in air would align itself so that one end always pointed toward the North Pole of the earth. This end of the iron bar was called the north pole, or N pole, and the other end the south or S pole. Such a piece of iron ore was called a bar magnet. This principle became the basis for the compass, which has been used as an aid in navigation for over 1000 years.

Much of the electrical energy which man produces and controls depends upon magnetism for its origin. The generation, transmission, distribution and application of electricity are best understood after the actions of magnets are known. The terms used in magnetism and some of the special properties of magnets which have everyday value are discussed in this unit.

The term "magnet" is given to metals that have the property to draw or attract pieces of iron or steel. This magnetic property is found to a lesser degree in nickel, cobalt, chromium and magnesium. Historically, magnets have been known for many thousands of years. Almost 4,000 years ago in the city of Magnesia in Asia Minor a black rock was found that had the special property of attracting iron.

The black mineral pieces were called "magnets," - a name derived from the city, Magnesia. The first practical use for a magnet was made around the twelfth century when it was learned that a magnet which was free to rotate would swing until it came to rest in a north-south direction. With this discovery, early explorers built compasses to aid in navigation and exploration to open new routes, new worlds and new markets. The magnets in these first compasses were made by stroking a piece of steel to be magnetized with a natural magnet.

Fields of Force

Every now and then, scientists present a definition which needs but little in the way of explanation. Their definition of a field of force is simplicity in itself - *a field of force is a region of space where forces are present.*

Whether you realize it or not, you have spent your entire life in a field of force---the gravitational field which surrounds the earth. You have only to stumble over a roller skate and fall heavily to the ground to realize that such a force is in operation at all times. You have watched an object fall to the earth from your hand. Some force--we call it gravity--pulled it down. It will not take much imagination on your part to think of that pull being exerted by lines of force which extend up from the centre of the earth to its surface and on beyond it.

It will be found that a field of force is also present around a magnet and that the behaviour of magnets can be explained by the lines of force which act through them. Similarly, it will be shown later that fields of force exist when electrical charges are present.

Fields of Magnetic Influence

Magnetism first directed the attention of scientists to the idea of fields of force.

(1) Investigate this idea further by doing experiment 39 outlined on pages 76 and 77 of Laboratory Experiments. Do parts A, B, and C, making the diagrams and answering the questions for each part.

By definition, the space surrounding a magnet in which its influence can be detected is called its magnetic field. In spite of the fact that it is usually demonstrated on a flat surface, a magnetic field has three dimensions. The magnetic energy spreads out *in all directions* from the magnet through the space around it. In order to visualize such a field, you must try to imagine a kind of "cucumber" of lines--a solid mass of lines of force going through the magnet itself, travelling outward from its positive pole, and going inward at its negative pole.

First suggested in 1831 by Michael Faraday to explain magnetic attraction, lines of force around a magnet may be thought of as acting like tightly-stretched elastic bands and as such, tending to contract. These lines of force are thought to make a complete circuit around a magnet. They leave the magnet at its N. pole (positive pole), pass through the air, and enter again at its S. pole (negative pole). The influence of a magnet is entirely due to the lines of force which *move* through its magnetic field.

Magnetic Attraction and Repulsion

(2) Do the experiment outlined on page 15 of Electricity and Magnetism. What conclusions can you come to regarding marnetic attraction and repulsion?

When you test a magnetized iron needle, you will find that either end will attract an unmagnetized needle equally well. However, you would be mistaken if you thought that both ends were alike. If the needle is supported by a thin thread at its mid-point, you will find that it swings until one end points to the north and the other to the south. As soon as the needle has lined itself up, its poles can be recognized--one is the N. pole and other the S. pole.

If the S. pole of another magnetized needle is brought close to the N. pole of the swinging needle, there is attraction as the two poles attempt to cling together. But if the N. poles of the two needles are brought close to each other, there is repulsion as the two poles attempt to cling together. But if the N poles of the two needles are brought close to each other , there is repulsion as the two poles thrust each other aside. Similarly, the two S. poles will repel each other. These actions demonstrate a fundamental law of magnetism: *Unlike magnetic poles attract; like magnetic poles repel.*

When opposite magnetic poles are brought near each other, the lines of force seem to run together and the field of force between them is similar to the one around a single magnet. If you remember that these lines act like tightly-stretched but contracting elastic bands, their tendency to occupy as little space as possible pulls the two magnets together and accounts for the *attraction* between unlike magnetic poles.

Magnetism by Induction

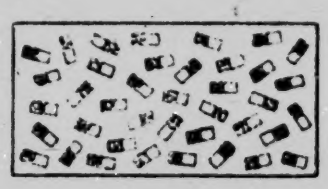
When a bar of soft steel is placed in the field of a powerful magnet, it will also become a magnet. Test this for yourself:

Such a demonstration will show that iron or steel pieces will become magnets in a magnetic field. This purpose of magnetizing iron or steel by bringing it near a magnet is termed magnetism by induction. Such magnetism is induced more easily into soft iron than into hard steel. However, the steel will retain its magnetism for a long time while the soft iron loses the magnetism induced into it almost as soon as the magnet is taken away.

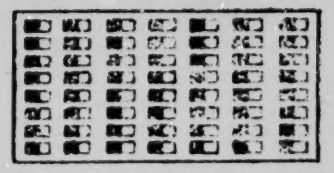
Have you ever wondered why a magnet picks up iron objects with such ease? The answer whould be obvious now; it is because of magnetization by induction. When the iron object comes in contact with a magnetized pole, it becomes *oppositely* magnetized; that is, the part of the iron closest to the N. pole of a magnet will become a S. pole. Then because unlike poles attract, the bit of iron clings tightly to the magnet.

Theories of Magnetism

Exactly what magnetism is, and how it exerts a field of force, can best be explained by either one of two theories.



Unmagnetized Iron



Magnetized Iron

Fig. 48--First Theory of Magnetism--Particles are Aligned

Theory No. 1 states that a magnet is made up of a very large number of small magnetized particles. When a bar of iron is not magnetized, the small magnetic particles are arranged in a random manner (Fig. 48). But when the bar of iron becomes a magnet, the magnetic particles are aligned so that their individual effects add together to form a strong magnet.

Theory No. 2 about magnetism concerns the electron. The electron has a circle of force around it, and when the electron orbits are aligned in a bar of iron so that the circles of force add together, the bar is magnetized.

While iron is one of the better known magnetic materials, remember that some materials are non-magnetic since they never exhibit any of the properties of magnetism. Some of the non-magnetic materials are wood, paper, glass, copper, and zinc.

SUMMARY

- The properties of natural magnets have been known for thousands of years and have played important roles in navigation and exploration.
- Each magnet has two poles (North and South).
  - Like poles repel each other
  - Unlike poles attract each other.
- A magnetic field surrounds a magnet.
- The intensity of a magnetic field is greatest at the poles.
- Nonmagnetic materials do not affect the lines of force.
- Magnetic materials, placed between two magnets, shield the magnets.
- Magnetic lines of force follow the path of least resistance.

For another look at some theories concerning magnetism be sure to read Pages 12 - 18 in Electricity and Magnetism.

When you, and the members of your group have completed the laboratory experiments and the reading, review and discuss the objectives with each other and the instructor, and move on to Item 2.

UNIT XIV: ELECTRICITY

ITEM B: STATIC ELECTRICITY

OBJECTIVES

The student must be able to...

1. Explain the nature of static electricity in terms of electrons and protons.
2. Demonstrate and explain electrostatic charging by friction.
3. Demonstrate and explain electrostatic charging by induction.
4. Demonstrate and explain electrostatic charging by conduction.
5. State the Law of Electrostatics.

LEARNING RESOURCES

Book: Electricity and Magnetism, Case Histories in Science

Laboratory Apparatus:
- 100 ml florence flask
- stopper
- copper wire
- aluminum foil
- ebonite rod
- glass rod
- pith balls

LEARNING ACTIVITIES

Recall from your study of atoms that:

1. Every atom is composed of a positively charged nucleus, around which are distributed a number of negatively charged electrons.

2. The electrons of all atoms are alike -- that is, they all have the same quantity of negative charge and the same mass.

3. The nucleus is composed of protons and neutrons. (The only exception is the common form of hydrogen, which has no neutrons.) Protons are almost 2000 times more massive than electrons, but carry an amount of positive charge equal to the negative charge of the electron. Neutrons are slightly more massive than protons and have no net charge.

4. Every normal atom has exactly as many electrons surrounding its nucleus as it has protons within its nucleus. Thus a normal atom has no net charge.

CHARGING BY FRICTION:

We are all familiar with the electrical effects produced by friction, as when we scuff our shoes across a rug and then produce a spark when we reach for a door knob. Or when we comb our hair and hear the crackle of sparks that are produced, or see them if we are in front of a mirror in a dark room. Or often we may slide across plastic seat covers in an automobile and produce sparks when we touch the door handle. In all these cases electrons are being transferred by the friction of contact from one material to another.

Although the innermost electrons in an atom are bound very tightly to the oppositely charged nucleus, the outermost electrons of many atoms are bound very loosely and can be easily dislodged. The force with which the outer electrons are held in the atom varies for different substances. The electrons are held more firmly in rubber than in fur, for example. Hence, when a rubber rod is rubbed by a piece of fur, electrons transfer from the fur to the rubber rod. The rubber therefore has an excess of electrons and is said to be negatively charged. The fur, in turn, has a deficiency of electrons and is said to be positively charged. If we rub a glass or plastic rod with silk, we find that the rod becomes positively charged. The silk has a greater affinity for electrons than the glass or plastic rod. Electrons are rubbed off the rod and onto the silk. In summary:

An object which has an imbalance of electrons and protons is electrically charged. If it has more electrons than protons, the object is said to be negatively charged. If it has fewer electrons than protons, then it is positively charged. Because no electrons are created or destroyed, but are simply transferred from one material to another, we say that charge is conserved.

CHARGING BY INDUCTION:

A suspended, positively charged rod is repelled by another positively charged rod, and attracted by a negatively charged rod. But how can a charged rod attract an uncharged or neutral object such as a bit of paper? And why is it that the paper will be attracted to both a positively and negatively charged rod? What happens is that a charged rod is brought near the paper, and the charges in the molecules making up the paper are redistributed. For example, if a positively charged rod is brought near the paper, it attracts the electrons in each paper molecule to the side of the molecule nearest the rod. No electrons have been added or removed. The paper is electrically neutral, but the surface layer nearest the charged rod contains the negative sides of molecules on that surface, while the far surface contains the positive sides of molecules on that surface. The negative surface is closer to the charged rod than is the positive surface. Therefore the force of attraction is greater than the force of repulsion and the piece of paper is attracted toward the charged rod. If the rod is negatively charged, then the charges within the paper are oriented with the positive surface of the paper nearest the rod and negative surface farthest away, again resulting in an attraction between the paper and the rod.

The bits of paper are electrically neutral, but their charges have been redistributed. This redistribution of atomic and molecular charges is called *charge polarization*. This inducement of charge polarization has occured without there being any contact between the rod and the paper. The surface of the paper has been *charged by induction*. When the charged rod is removed, the induced surface charge disappears. Sometimes a charged rod attracts a piece of paper in this way and the paper clings to the rod. Suddenly the paper flies off the rod. What happens in this case is that the paper touching the rod may acquire a charge by contact, where electrons on the rod repel one another and transfer onto the paper. The paper then has the same sign charge as the rod and is repelled.

When we rub an inflated balloon against our hair we charge the balloon by contact. Electrons are rubbed from our hair onto the balloon, which is then negatively charged. We find that the charged balloon easily sticks to the wall or any insulating surface. This is because the charged balloon induces an opposite charge on the surface of the wall. The molecules in the wall become polarized, like the pieces of paper in the previous example. If the balloon is negative, a layer of positive charge is induced in the wall, and both balloon and wall attract each other. Since both the wall and balloon are good insulators, very little charge transfers from the balloon to the wall.

Charging by induction takes place during thunderstorms. The bottoms of negatively charged clouds induce a positive charge on the surface of the earth beneath. Benjamin Franklin was the first to demonstrate this when he proved during his famous kite-flying experiment that lightning was an electrical phenomenon.* Lightening is an electrical discharge between the clouds and oppositely charged ground, or between oppositely charged clouds.

Franklin also found that charge leaks off sharp points, and fashioned the first lightning rod. If the rod is placed above a structure and connected to the ground, charge induced by the clouds leaks off the rod and prevents an electrical discharge from occurring. If for any reason sufficient charge does not leak off the rod and lightning strikes anyway, it will be attracted to the rod and directed through the metal path to ground, thereby sparing the structure.

**In addition to being an American statesman, Benjamin Franklin was a first-rate scientist. He introduced the terms "positive" and "negative" as they relate to electricity, and established the "one fluid" theory of electricity. He contributed to an understanding of induction, grounding, and insulation.*

Read pages 2 to 8 in Electricity and Magnetism. This will give you some additional theoretical knowledge regarding static electricity.

(1) Do the experiment on the electroscope, outlined on page 5 of Electricity and Magnetism. Use the apparatus which you find in your lab, and bring anything else you need from home. Discuss the results.

(2) Investigate static electricity further by doing the experiment outlined on page 8 of Electricity and Magnetism. Use pith balls provided in the lab, instead of a balloon. Discuss the questions with your group.

CHARGING BY CONDUCTION:

In an earlier experiment, it was noticed that when a negatively charged rod was touched to an uncharged pith ball, the ball thrust itself away a few moments after actual contact was made with the rod. Remembering that like electrostatic charges repel one another, you could conclude the pith ball had gained a negative charge when the two objects were touched together. Tests of a similar type will show that whenever a neutral object is touched with a charged one, a *like* charge is developed on the touched object. This way of producing a charge by touching a neutral object is called charging by conduction.

ACQUIRING HUGE STATIC CHARGES:

In damp weather, we seldom notice electrostatic charges on objects -- moist air is a fairly good conductor and charges are carried away as fast as they are made. On clear cold days, however, the air may be so dry that the charges are not carried off and they accumulate on certain non-conductors. At such times people may notice a spark and get a shock when they touch a doorknob or some other metallic object. Charges taken on their bodies are discharged in this way. Although these little sparks may seem harmless, they may be sufficient to cause an explosion or start a fire.

Manufacturers report that belts made of leather and other materials used as conveyors or for transmitting power will often take on huge static charges. Any sparks resulting from their discharge might cause a disastrous explosion if inflammable gas or combustible dust is present in the air. Such discharges have set off fires and explosions in flour mills, sugar refineries, munition works, hospital operating rooms, and in petroleum and chemical plants. Even around the home, there is a danger of serious accident from a static discharge if gasoline is used to clean fabrics or scrub floors. In spite of repeated warnings about this danger each year many people are badly burned or die in explosions from this cause.

Safety Hint
Using non-inflammable fluids for dry-cleaning purposes in the home will make explosions from discharges of static electricity impossible.

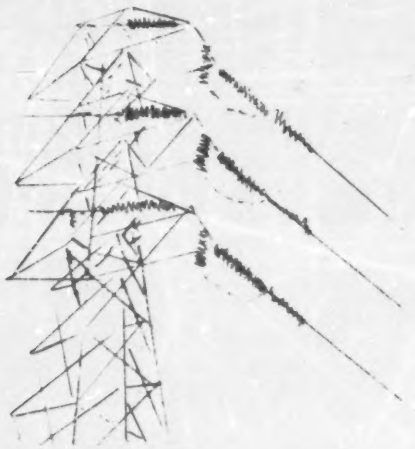
Automobiles running over long bridges often acquire heavy charges of static electricity because rubber tires insulate a car and do not allow the charges to escape. Wire brushes and water sprays are used to carry off these accumulated charges, otherwise the bridge attendant would receive a severe shock when he attempted to take money or toll tickets. Aircraft can also

become electrified and care must be taken to remove any charges before they become dangerous.

If special precautions are not taken, trucks which carry gasoline and other oil products would become charged as they move around; the sloshing movement of liquids in their tank compartments is given as the chief cause of such electrification. Imagine what might happen if a huge static charge was present and a spark jumped between the metallic parts of the delivery hose and the gasoline storage tanks. To prevent such accidents, the truck is "grounded" by a dangling chain or a small wheel which allows charges to escape as quickly as they are formed.

CONDUCTORS AND INSULATORS

All substances can be arranged in order of their ability to conduct electrical charges. Those at the top of the list are referred to as *conductors* and those at the bottom as *insulators*. But the ends of the list are very far apart. Nearly all metals are relatively good conductors, and most nonmetals are poor ones. The conductivity of a metal, for example, can be more than a billion-billion times greater than the conductivity of an insulator such as glass. In a power line, for example, charge flows much more easily through hundreds of miles of metal wire than through the few inches of insulating material separating the wire from its supporting tower. In a common appliance cord in the home, charge moves through several feet of wire to the appliance, then through the electrical network in the appliance, and then back through the other wire in preference to flowing across from one wire to the other through a small fraction of an inch of rubber insulation.



It is easier for electricity to flow through hundreds of miles of metal wire than through a few inches of insulating material.

Whether a substance is classified a conductor or insulator depends on the interatomic bonding and on how tightly the atoms of a substance hold their electrons. Each atom in a metal, for example, contributes one or more electrons to a general sea of electrons attached to no particular atom. These *conduction electrons* are free to wander long distances throughout the material. On the other hand, all the electrons in an insulating material are attached to particular atoms. Small differences in the bonding between atoms account for very large differences in conductivites.

UNIT XIV: ELECTRICITY

ITEM C: CURRENT ELECTRICITY

OBJECTIVES

The student must be able to...

1. Describe the nature of current electricity.
2. Demonstrate two methods of producing current electricity.
3. Explain electromagnetic induction and the significance of Faraday's Law.
4. Apply the "left hand rule" in determining the polarity and direction of magnetic flux of a coil.
5. Define the following terms, and apply them in describing electric currents:
   - electromotive force
   - current flow
   - resistance
6. State and apply Ohm's Law to electrical circuits.
7. Distinguish between open, closed, short, series, and parallel circuits.
8. Solve simple problems involving series circuits.
9. Solve simple problems involving parallel circuits.
10. Identify the similarities and differences between electric generators and electric motors.
11. Distinguish between electrical power and electrical energy.

LEARNING RESOURCES

Books: Electricity and Magnetism, Case Histories in Science

Practical Modern Physics, Cambridge

Laboratory Apparatus:

insulated wire	3 dry cells
St. Louis electric motor	knife switch
galvanometer	iron filings
compass	cardboard
bar magnets	electromagnet

LEARNING ACTIVITIES

In Items *A* and *B* of this Unit, you studied magnetism and static electricity. In Item *C* you will use this knowledge to study electricity as it flows in a current. Current electricity is the flow of electrons through a conductor. This is comparable to static electricity, which you found to be the accumulation of electrons in a non-conductor. Current electricity can be produced in two ways: by either chemical reaction, or by a physical action and you will do a demonstration of each, so read on!

The discovery that electricity could be produced from magnetism was of great importance to the world. That discovery began the industrial revolution. Both Joseph Henry of America and Michael Faraday of Scotland independently in 1831 discovered that when a magnet was plunged into a coil of wire, a voltage was induced. Electric current could be made to flow in a wire by simply moving a magnet in or out of a coil of wire. This phenomenon is called *electromagnetic induction*.

Electromagnetic induction in a conductor depends only on the relative motion between the conductor and the magnetic field. Voltage is induced whether the magnetic field of a magnet moves by a stationary conductor, or the conductor moves in a stationary magnetic field. The results are the same whether either or both move.

The greater the number of loops of wire moving relative to a magnetic field, the greater the induced voltage, and the greater the current in the wire. Twice as many loops will induce twice as much voltage; ten times as many loops will induce ten times as much voltage, and so on. The amount of voltage induced also depends on how quickly the magnetic field lines are traversed by the wire. Very slow motion produces hardly any voltage at all. Quick motion induces a greater voltage. If a magnet is plunged in and out of a coil of wire the voltage induced in the coil alternates in direction. As the magnetic field strength inside the coil is increased (magnet entering), the induced voltage in the coil is directed one way, and when the magnetic field strength diminishes (magnet leaving), the voltage is induced in the opposite direction. The greater the frequency of field change, the greater is the induced voltage. The frequency of the changing magnetic field within the loop is equal to the frequency of alternating voltage induced.

Electromagnetic induction can be summarized in the statement:

> *The induced voltage in a coil is numerically equal to the product of the number of loops and the rate at which the magnetic field intensity changes within those loops.*

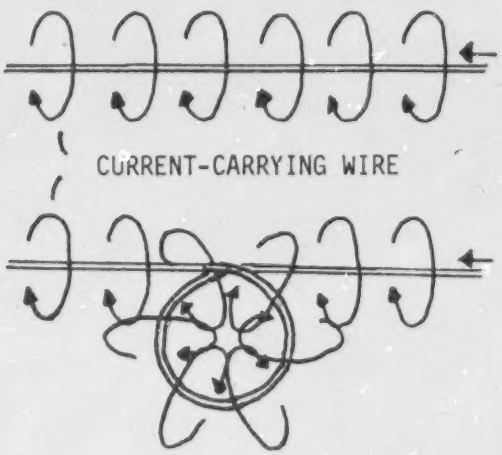
This statement is called Faraday's Law.

(1) Read pages 21 to 24, and then 34 and 35 in Electricity and Magnetism. When you have finished this, do Faraday's experiment, which is outlined on page 36.

Read pages 24 to 26 in Electricity and Magnetism. Pay particular attention to the "left-hand rule" which is quite important.

(2) Interaction between an electrical conductor and magnetic fields. Do the experiment outlined on page 32 of Electricity and Magnetism. Follow the directions carefully, sketch diagrams of your results, and discuss them with the others in your group

If a wire carrying a current is bent into a loop, the magnetic field lines that surround the wire are bunched up inside the loop. If the wire is bent into another loop, overlapping the first, the concentration of magnetic field lines inside the double loop is twice as much as in the single loop. It follows that the magnetic field intensity in this region is increased as the number of loops are increased. The magnetic field intensity is appreciable for a current-carrying coil of wire with many loops.



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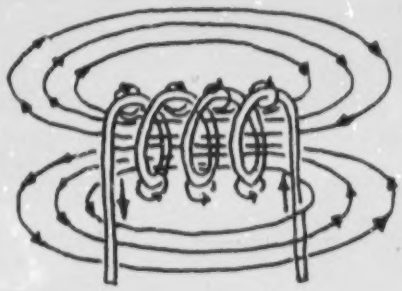
If a piece of iron is placed in such a coil, the magnetic domains in the iron are induced into alignment, which further increases the magnetic field intensity. And we have an electromagnet!



Direction of Magnetic Flux and Polarity of a Coil

A study of the coil reveals that the magnetic lines pass through the coil and each line makes a complete circuit by returning along a path outside the coil. The side at which the flux emerges is the north pole; the other end where the magnetic lines re-enter, is the south pole.

FLOW OF CHARGE: When the ends of a conductor are placed between two bodies of different temperatures, heat is transmitted from the higher temperature to the lower temperature. Heat "flows" through the conductor when a difference in temperature exists across its ends. When both ends reach the same temperature, the "flow" of heat ceases. In a similar way, when two bodies of different electric potential are joined with an electrical conductor, charge flows from the higher potential to the lower potential. Charge flows when there is a *potential difference* across the ends of a conductor. This flow of charge persists until both bodies reach a common potential. When there is no potential difference, no flow of charge will occur.

To attain a sustained flow of charge in a conductor, some arrangement must be provided to maintain a difference in potential while charge flows from one end to the other. The situation is analogous to the flow of water from a higher reservoir to a lower one. Water will flow in a pipe connecting the reservoirs only as long as a difference in water level exists.

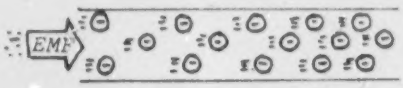
ELECTROMOTIVE FORCE AND CURRENT: There are many kinds of electric pumps, usually called "seats" of *electromotive force* (emf). If we charge a rubber rod by rubbing it with fur, we can develop a large difference in electrical potential between the rod and fur. Such a combination does not make a good electrical pump because when connected by a conductor the potentials equalize in a single brief surge of moving charges. Such a combination cannot maintain a sufficient flow of charge to be of practical importance. Chemical batteries or generators, on the other hand, are capable of maintaining a steady electrical flow. Any seat of emf such as a battery or generator is a source of energy. In chemical batteries, the disintegration of zinc or lead in acid results in a separation of electric charge, and the energy stored in the chemical bonds is converted into electrical energy. Both batteries and generators convert their stores of energy into electrical energy by piling up negative charge on one of their terminals and positive charge on the other.

The electrical potential energy stored in the oppositely charged battery or generator terminals provides the difference in potential, or voltage, responsible for the flow of the electrons in the circuit joining the terminals.

Electric current is simply the flow of electric charge. In solid conductors, it is the electrons that flow through the circuit, while in fluids, ions as well as electrons may comprise the flow of electrical charge. The *rate* of electrical flow is measured in *amperes*, or simply amps. An ampere is the rate of flow of one unit of charge per second. In a wire carrying 5 amperes, for example, 5 units of charge pass any cross section in the wire each second. In a wire carrying 10 amperes, twice as many charges pass any cross section each second.

ELECTROMOTIVE FORCE AND ITS MEASUREMENT:

The electrons in a material remain stationary until a force causes them to move. When the electrons move, an electrical current is produced.



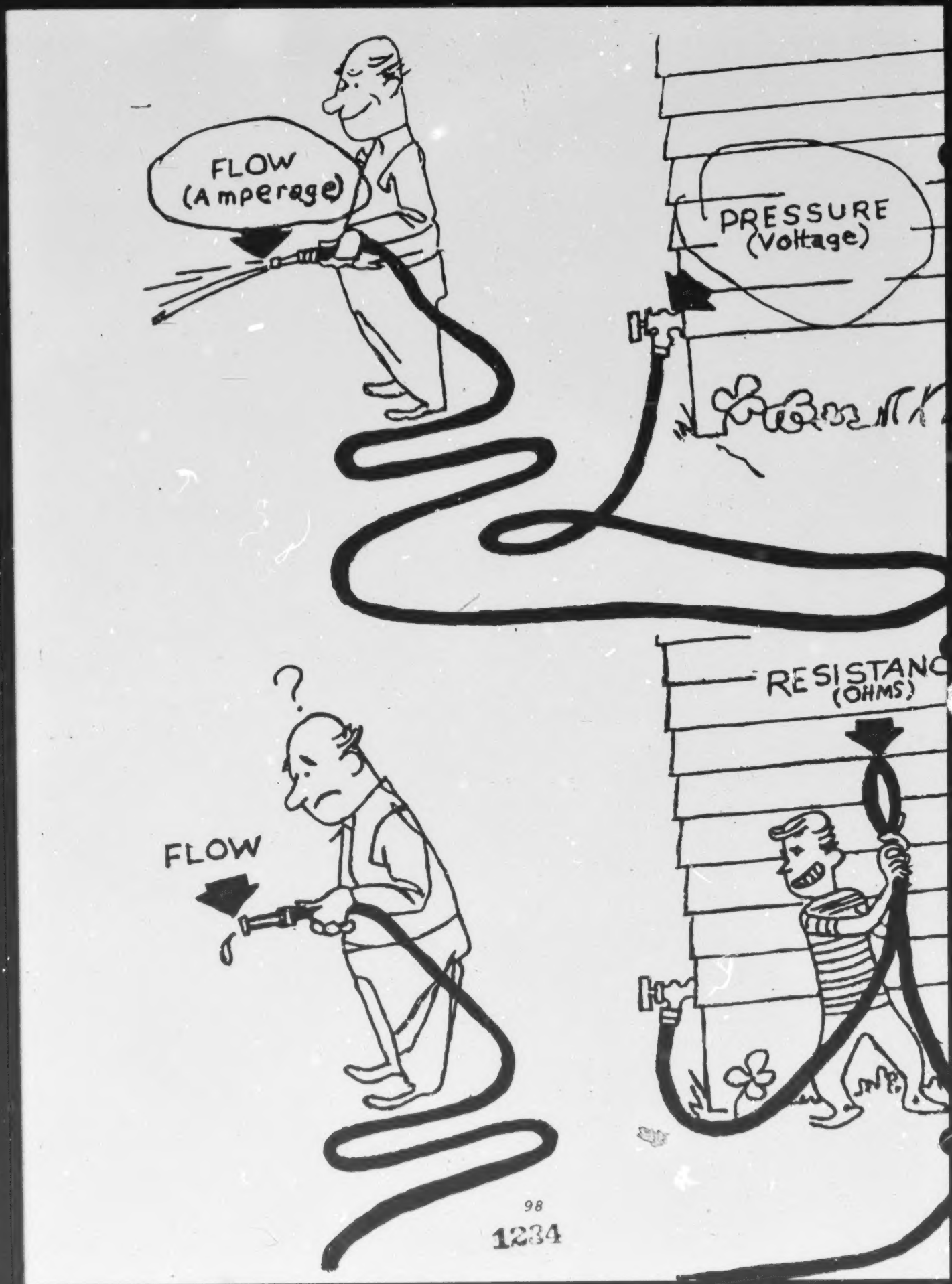
Electrical Pressure (EMF) Causes Current

MAINTAINING THE ELECTROMOTIVE FORCE (E M F)

Electrons tend to flow continually as there is a difference in potential. In batteries, the continuous flow is produced by chemical action. Since the major source of electrical power is magnetism, it is the continuous movement of generator wires through magnetic fields which keeps a constant unequal charge at both terminals of a generator. Thus, as motors, lights, and other electrical devices are connected to the source of electric energy, the current causes a bulb to light, a motor to turn, and other electrical devices to operate.

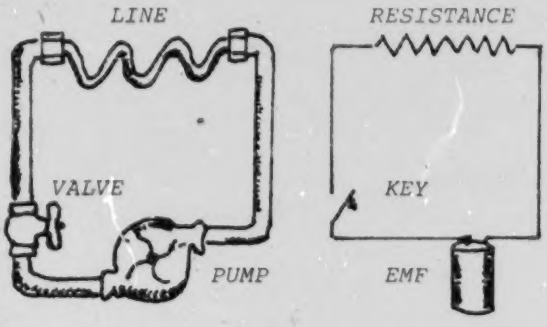
Voltage and Current

Every bulb, motor, and other electrical appliance and device requires a fixed amount of voltage and current in order to operate. The ordinary bulb operates on 117 volts; small motors, usually 117 or 234 volts. These voltages produce the amount of current needed for efficient operation. If the voltage is less, the bulb does not burn brightly nor does the motor do the work that it is rated to do. A heavier voltage than specified produces an excessive current which causes the bulb, motor, other equipment or instrument to "burn out". Protection against such overloads is provided by a "fuse" either in the power line or on the equipment, or both.


FLOW
(Amperage)
PRESSURE
(Voltage)
RESISTANC
(OHMS)
?
FLOW

ELECTRICAL RESISTANCE:

A battery or generator of some kind is the prime mover and source of voltage in an electrical circuit. There is another equally important factor, however, controlling the rate at which charge flows - *resistance*. As the rate of water flow in a pipe depends upon the amount of pressure behind the water, it is also governed by the amount of resistance offered to the flow. Smooth-walled pipes, for example, offer less resistance than rough-walled ones. Pipes of small cross section offer greater resistance than pipes of large cross section, and long pipes offer greater resistance than short ones. These factors also enter into electrical considerations. We have already discussed the fact

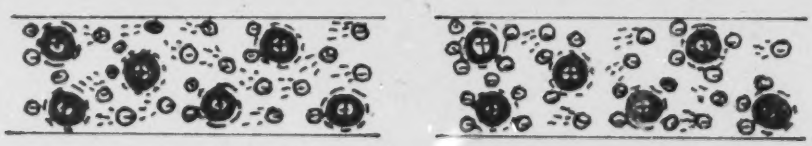


Analogy between a simple hydraulic and an electrical circuit.

that different substances conduct electricity differently. It is also a fact that the electrical resistance of a wire depends upon its thickness and length. Electrical resistance is less in thick wires. The longer the wire, of course, the greater the resistance. In addition, electrical resistance depends on temperature. The greater the jostling about of atoms within the conductor, the greater resistance the conductor offers to a flow of charge. For most conductors, increased temperature is accompanied by increased resistance.

KIND OF MATERIAL AFFECTS RESISTANCE:

Current is the movement of free electrons. This movement is controlled by the opposition or the freedom with which the electrons may move through a material. This opposition is called "resistance."

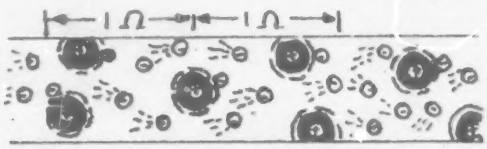


Materials Offer Different Resistance

Resistance is present in varying degrees in different materials. Those materials known as good conductors of electricity offer a minimum of resistance to current. By contrast, the best insulators are those materials which resist the flow of free electrons. Thus, the material used is one factor in controlling resistance. Such metals as silver, copper, aluminum and steel each offer a different resistance to electron flow depending on how easily the electrons in the outer orbit of the atom move.

LENGTH OF MATERIAL AFFECTS RESISTANCE:

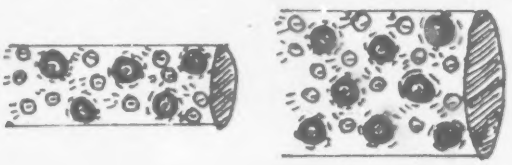
The longer the path of an electric current, the greater the resistance offered to current flow. A nichrome wire 20 feet long offers a greater resistance than a one foot piece of the same size nichrome wire. As a matter of fact, the resistance is 20 times greater because the electrons are held by 20 times as many atoms.



Resistance Increases with Length

CROSS-SECTIONAL AREA CONTROLS RESISTANCE:

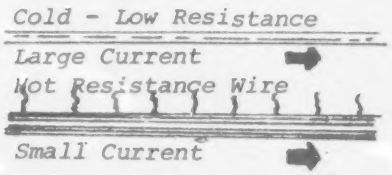
The cross-sectional area of a material also affects the resistance offered to current. The greater the cross-sectional area of a conductor, the less resistance is offered. If the cross-sectional area is doubled, twice as many electrons are available to move and the current is doubled.



TEMPERATURE CONTROLS RESISTANCE:

A fourth condition which controls resistance is the "temperature" of the conductor. Temperature controls the ease with which electrons flow until the maximum heat of the conductor is reached. The greater the temperature, the greater hindrances to electron flow are produced by atom vibration.

Conversely, the colder a conductor is, the greater the ease with which the electrons flow. The variation in resistance due to temperature differences depends on the material. The effect of temperature changes is slight on such conductors as copper and aluminum.



OHM'S LAW:

Voltage, current, and resistance are related by a statement called *Ohm's Law*. It states that the amount of current in a circuit is directly proportional to the voltage (emf) impressed across the circuit, and is inversely proportional to the resistance of the circuit. In short,

$$\text{Current} = \frac{\text{voltage}}{\text{resistance}}$$

For example, if we double the voltage across the ends of a circuit, the current will double; if we instead double the resistance of a circuit, the current will be reduced by half - the greater the voltage, the more current; the greater the resistance, the less current. The unit of resistance is called the *ohm*, after George Ohm who discovered the above relationship in 1826. We can say that if a potential difference of 1 volt is impressed across a circuit having a resistance of 1 ohm, a current of 1 ampere will be produced. The resistance in a typical lamp cord is much less than 1 ohm, while a typical light bulb has a resistance of about 100 ohms. From Ohm's Law, we see that 100 volts impressed upon such a bulb draws about 1 ampere of current. An iron or electric toaster has a resistance of 15 to 20 ohms. The low resistance permits a large current which produces considerable heat. Inside radio and television receivers, current is regulated by circuit elements called *resistors* whose resistance varies from a few ohms to millions of ohms.

DETERMINING VALUES FOR CURRENT, VOLTAGE AND RESISTANCE (OHM'S LAW):

Up to this point, the meaning and the measurement of current, voltage, and resistance have been discussed. In review, current refers to the movement of more negatively charged free electrons in the direction of a more positive charge. The voltage is the "pressure-energy" (EMF) applied to cause electrons to flow through a resistance. Resistance is the opposition offered to the flow of free electrons. The amount of current (amperes), the differential in pressure (voltage), and the resistance (ohms), each affect one another.

APPLICATION OF OHM'S LAW:

For instance, if the resistance remains the same, as the voltage decreases, the amount of current also decreases. Using a constant voltage, a material with a low electrical resistance makes possible a larger current than if a higher resistance is used. This relationship of current. voltage, and resistance was studied many years ago by George S. Ohm, a mathematician. In 1827 Ohm stated this relationship mathematically by the formula:

$$\text{Current } (I) = \frac{\text{Voltage } (E)}{\text{Resistance } (R)} \text{ ; or Amperes} = \frac{\text{Volts}}{\text{Ohms}}$$

This formula, known as "Ohm's Law" has been and is one of the most widely used laws of electrical science. The importance of this law lies in its

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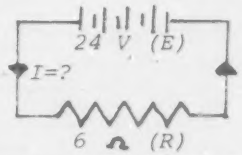
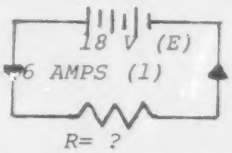
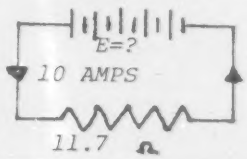
practical use for finding any one value when the other two values are known. The three forms in which Ohm's Law may be written are shown in the accompanying table. When any one of these formulas is used, the electrical units must be expressed in amperes, volts and ohms.

Current (I, Amperes) = $\frac{\text{Voltage (E, Volts)}}{\text{Resistance (R, Ohms)}}$	$I = \frac{E}{R}$
$\frac{\text{Voltage (E)}}{\text{Current (I)}}$ = Resistance (R)	$R = \frac{E}{I}$
Current (I) x Resistance (R) = Voltage (E)	$E = IR$

PROBLEMS:

Three simple electrical diagrams are given to show how each value may be determined mathematically by simple application of Ohm's Law.

Find Current	*Find Resistance*	*Find Voltage*
		
$I = \frac{E}{R}$ $I = \frac{24 \text{ volts}}{6 \text{ ohm}} = 4 \text{ amperes}$	$R = \frac{E}{I}$ $R = \frac{18 \text{ volts}}{6 \text{ amps}} = 3 \text{ ohm}$	$E = IR$ E=10 amps(11.7 ohms)= 117 volts

FIND THE MISSING NUMBERS:

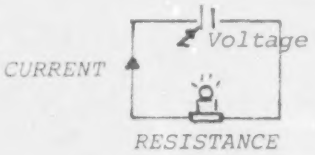
	I	E	R
a)	5	5	?
b)	2	?	42
c)	?	220	1.5
c)	.02	?	1.5
e)	12.5	125	?
f)	?	110	25
g)	?	6	.05
h)	8.25	120	?

Check the answers with the key on the last page of this item, after completing the questions.

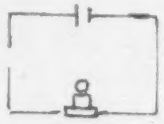
Before you go on to read and learn about circuits, look at pages 69 to 74 in Modern Practical Physics. Here you will find a brief outline of what you have studied so far, and what you will further study in this Item. Use the outline here to help you make notes on what you study.

OPEN AND CLOSED ELECTRICAL CIRCUITS:

Electrons flow between two unequal charges when a path is provided through a conductor. When there is a complete electrical pathway from the negative terminal of a battery to a lamp and back to the positive terminal of the battery, an "electrical circuit" is formed. So long as



Closed (Complete) Circuit



Open (Broken) Circuit

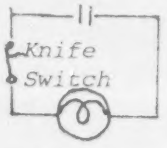


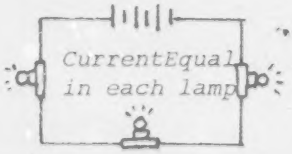
Diagram of Simple Circuit

this pathway is complete, the circuit is known as a "closed" one. If the circuit is broken, the term "open circuit" is used. Every complete circuit has a current, a voltage and a resistance.

A convenient device for opening or closing a circuit safely is a "switch". Switches are made in many different sizes and a variety of shapes depending on the nature and quantity of the current and the circuits to be controlled.

SHORT CIRCUITS:

When switches are used, a circuit may be opened or closed at will. Just the opposite condition prevails when a circuit is "shorted". A "short" may be caused by two bare wires touching each other, or when the terminals of a resistance are connected together, or by other improper



Normal Operating Conditions

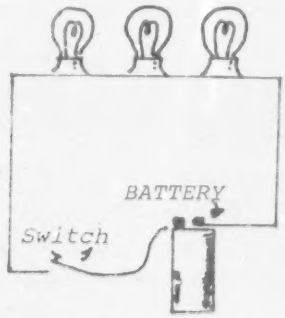
Excessive Current

wiring. A short has the effect of cutting out or reducing the total resistance, causing a larger amount of current than usual. Excessive current produces heat and if a circuit is not protected properly with fuses or other electrical devices to open an overloaded circuit, the parts will be damaged.

Electrical appliances and other devices having electrical resistance are usually connected in a circuit in two ways, *series* or *parallel*. When they are connected in series, they form a single pathway for current flow between the terminals of the battery, generator, or wall socket which is simply an extension of these terminals. When they are connected in parallel, they form branches, each of which provides a separate path whereby current can flow between the two points they connect. Each type of connection has its own characteristics and uses. We shall treat circuits using these two types of connections briefly.

SERIES CIRCUIT:

A simple series circuit is shown. Three lamps are connected in series with a battery. Electrons leave the negative terminal of the battery, pass through each of the resistive filaments in the lamps in turn, and then return to the positive terminal of the battery. This is the only pathway over which the electrons can travel through the circuit. A break anywhere in the path results in an open circuit and stops the flow of current. Such a break might be simply opening the switch, or the burning out of one of the lamp filaments.



A simple series circuit.

This circuit illustrates the following major characteristics of series connections:

1. Since the electrons can follow only a single pathway through the circuit, the current passing through the resistances in the electrical devices and all other parts of the circuit is the same.

2. This current is resisted by the resistance in the first device, the resistance in the second, and in the third in turn so that the total resistance to current flow in the circuit is the sum of the individual resistances along the circuit path.

3. From Ohm's Law, the current flowing in the circuit is numerically equal to the voltage supplied by the battery divided by the total resistance of the circuit.

4. The total voltage applied to the circuit divides among the individual electrical devices in the circuit, so that the sum of the "voltage drops" across the resistance of each individual device is equal to the impressed voltage supplied by the emf. This follows from the fact that the energy used to move each unit of charge through the entire circuit is simply the sum of the energies used to move that unit of charge through each of the resistors in turn.

5. The voltage applied to the circuit divides among the individual electrical devices so that the voltage drop across each device is proportional to its resistance. This follows from the fact that more energy is used to move a unit of charge through a large resistance than through a small resistance.

It is easy to see the chief disadvantage of the series circuit; that is, that all the devices must be operating at the same time, for if any one device is turned off, the circuit is broken and all current flow ceases. Most circuits are wired such that it is possible to operate electrical devices independently of each other. In the home, for example, a lamp can be turned on or off without affecting the operation of other lamps or electrical devices. This is because these devices are connected not in series, but parallel to one another.

You may be required to draw circuits. The various electrical components used are designated with symbols. These are:

dry cell

switch

ammeter

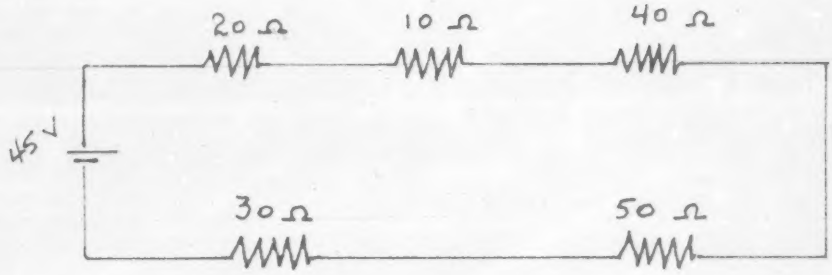
voltmeter

resistance (or resistor)

Before beginning these problems, study the examples given on pages 72 - 74 of Practical Modern Physics. When you have finished a problem, check your answer with the Key on the last page of this Item.

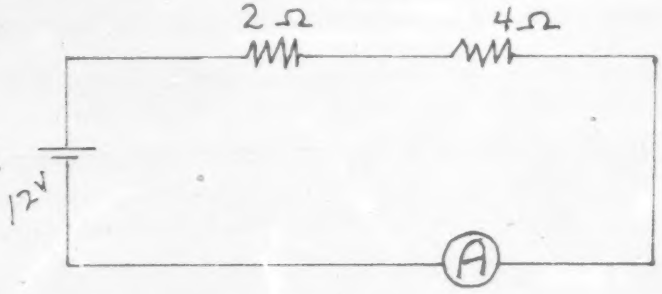
PROBLEMS ON SERIES CIRCUITS:

1.



What is the Total resistance in the circuit?
What current is flowing through each resistance?
What will be the sum of the voltage drops across the resistances?

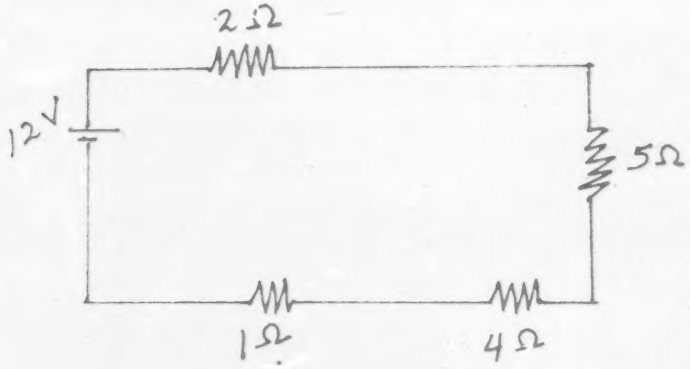
2.



What is the total resistance?

What current is flowing through each resistance?

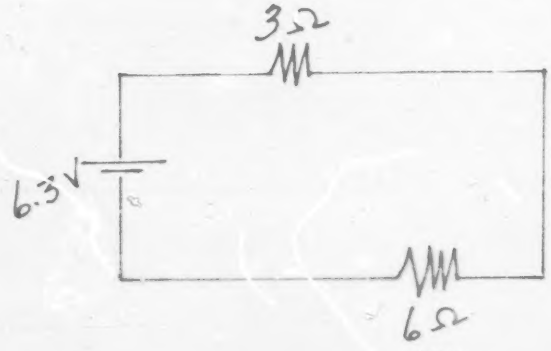
3.



What is the total resistance?

What is the current flow in the circuit?

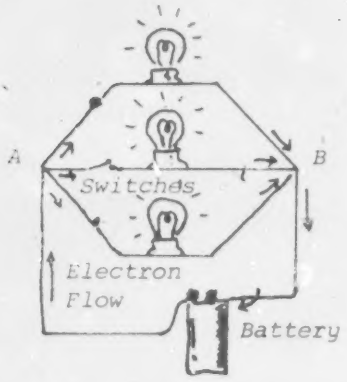
4.



What is the total resistance?

What current is flowing through the circuit?

PARALLEL CIRCUIT:



A simple parallel circuit.

A simple parallel circuit is shown. Three lamps are connected to the same two points, A and B, in the electrical circuit. Electrical devices connected to the same two points of an electrical circuit are said to be connected in parallel. Electrons leaving the negative terminal of the battery need travel through only *one* lamp filament before returning to the positive terminal of the battery. In this case there are three separate pathways over which the electrons can travel through the circuit. A break in any one path does not interrupt the flow of charge in the other paths. Each device operates independently of the other devices connected in the circuit.

This circuit illustrates the following major characteristics of parallel connections:

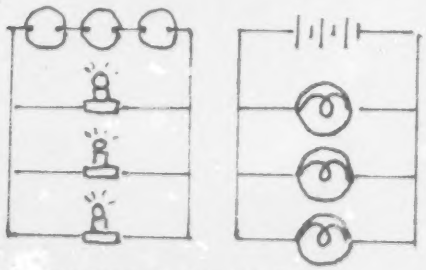
1. Since the devices connect the same two points A and B of the circuit, they have the same voltage across them.

2. The total current in the circuit divides among the parallel branches. Current flows more readily into devices of low resistance, so the amount of current in each branch is inversely proportional to the resistance of the branch.

3. The total current flowing in the circuit is equal to the sum of the currents flowing in its parallel branches.

4. As the number of parallel branches is increased, the overall resistance of the circuit is decreased. The resistance to current flow is lowered with each added path between any two points of a circuit. It follows that the combined resistance of resistors in parallel to the flow of current between the two points of the circuit which they connect is less than the resistance of any one of the branches.

A "parallel circuit" is one in which the resistances are connected side by side to each other with the ends connected to a power source. In the parallel circuit illustrated, the three lamps are connected in parallel. The voltage of each resistance in a parallel circuit remains constant and is equal to the voltage of the power source. However, the current through each resistance (lamp, in this case), depends on the amount of resistance. For example, in the home, a radio, television, lamp, refrigerator, and many other lighting fixtures and appliances depend for normal operation on a 117 volt power line. Where heavier loads are used, such as in newer domestic installations, the power lines may be operated on either 117 volts or 234 volts. In any case, while the voltage for each of the electrical devices is the same, more current takes the path of least resistance.



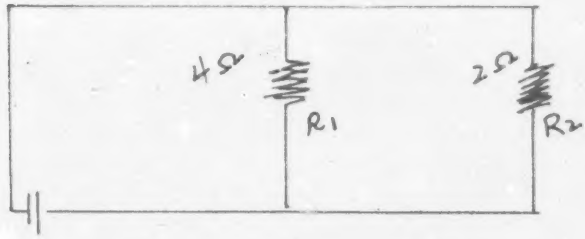
Resistances Connected in Parallel

The total resistance of a parallel circuit may be calculated as follows:

if R_T = Total Resistance

R_1 = Resistance of resistor (1)

R_2 = Resistance of resistor (2)



Then, $$\frac{1}{R_T} = \frac{1}{R_1} + \frac{1}{R_2}$$

$$\frac{1}{R_T} = \frac{1}{4} + \frac{1}{2}$$

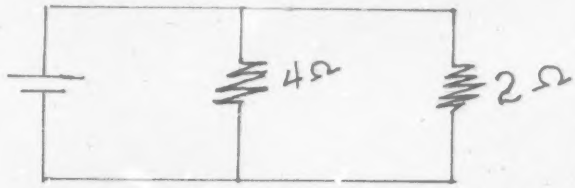
$$\frac{1}{R_T} = \frac{3}{4}$$

$$3 R_T = 4$$

$$R_T = \frac{4}{3} = 1\ 1/3\ \Omega$$

Therefore, the equivalent resistance is 1 1/3 r.

Consider a circuit in which a 4 ohm and a 2 ohm resistor are connected to a 12 volt battery. The resistors are in parallel with each other, since the battery voltage (12 volts) appears across each resistor.



The current through each resistor can be determined from Ohm's Law. For the 4 r resistor:

$$I = \frac{E}{R} = \frac{12}{4} = 3 \text{ amperes or 3 amps}$$

For the 2 ohm resistor: $I = \frac{E}{R} = \frac{12}{2} = 6$ amps

Then, the total circuit current supplied by the battery is 3+6 = 9 ampers.

Then, the equivalent resistance of the entire circuit has to be

$$R = \frac{E}{I} = \frac{12}{9} = 1\ 1/3\ \Omega$$

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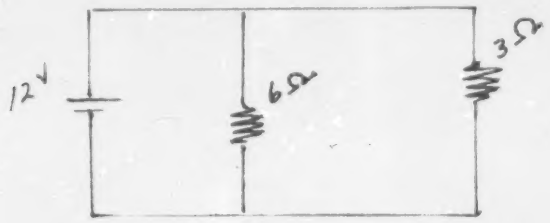
PROBLEMS ON PARALLEL CIRCUITS:

After completing these problems check your answer with the Key.

1.

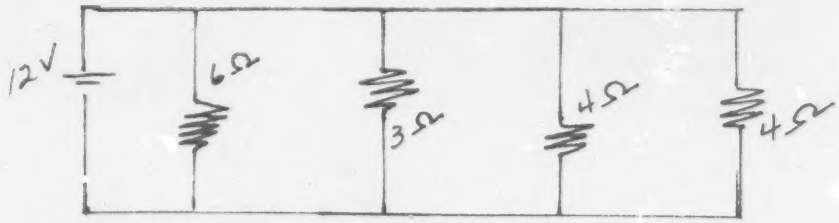


What is the current flow at the 6 ohm resistor?

What is the current flow at the 3 ohm resistor?

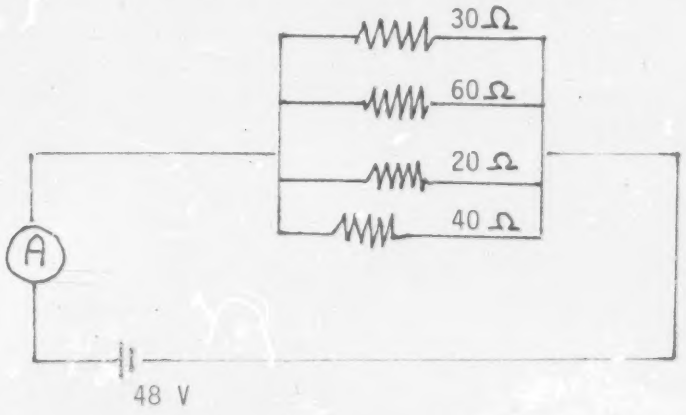
What is the equivalent resistance?

2.



What is the current flow at each resistor?
What is the equivalent resistance?

3.

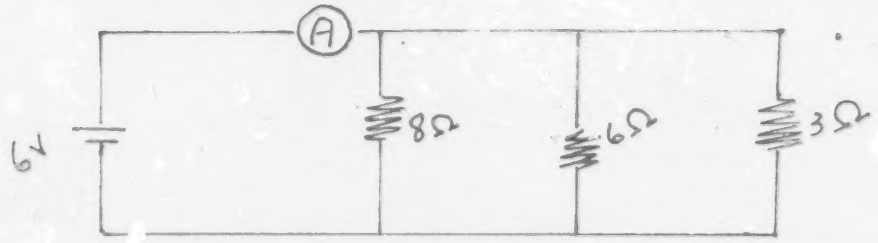


What is the total effective resistance?

What reading will be noted on ammeter A?

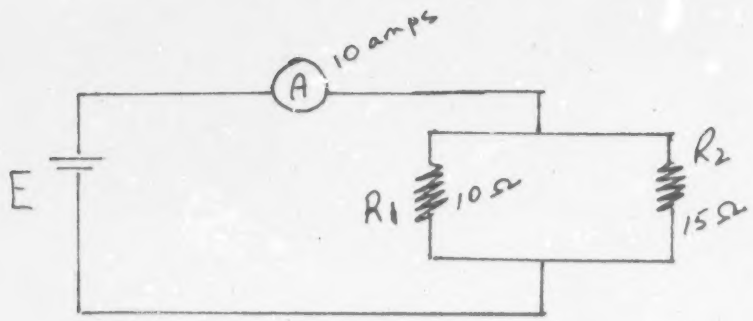
What is the voltage drop across each resistance?

4.



•What is the total effective resistance?
What reading will be noted on ammeter A?
What is the voltage drop across each resistance?

5.



Calculate: Voltage at E? _____

When you have completed all the work in this Item up to this point you will have a good bit of theoretical knowledge of electricity. In order that you put this theory to a practical application, do the following:

Now read pages 27 to 46 in Electricity and Magnetism. Part of what you will read is review (which you probably need!), but most of it deals with the uses and practical applications of electricity. Study carefully the information on electric motors and generators.

(3) Using an electric motor. Do the series of experiments outlined on pages 47 and 48 of Electricity and Magnetism. These will enable you to get a better understanding of how an electric motor runs, and how different types of electric motors operate.

(.) Do the Review Tests found on pages 77-80 and 87-90 of Practical Modern Physics.

This brings you to the end of this Item and to the end of Unit XI . Be sure to do a comprehensive review before attempting the Unit Progress Test. Work with your group members and use any books and references that are available. When you know what you have studied, and can do what is set out in all the objectives, write the Unit XI test.

ANSWER KEY

Answers to "Find the Missing Numbers".

	I	E	R
a)	5	5	1
b)	2	84	42
c)	146.6	220	1.5
d)	.02	.03	1.5
e)	12.5	125	10
f)	4.4	110	25
g)	120	6	.05
h)	8.25	120	14.5

Answers to "Problems on Series Circuits".

1. Total resistance is 150 ohms.
   Current flow is .3 amp.
   Voltage drop total is 45 volts.

2. Total resistance is 6 ohms (disregarding the ammeter).
   Current flow through each resistance is 2 amps.

3. Total resistance is 12 ohms.
   Current flow through the circuit is 1 amp.

4. Total resistance is 9 ohms.
   Current flowing through the circuit is 0.7 amps.

Answers to "Problems on Parallel Circuits".

1. Current flow at 6 ohm resistor is 2 amps.
   Current flow at 3 ohm resistor is 4 amps.
   Equivalent resistance is 3 ohms.

2. Current flow at 6 ohm resistor is 3 amps.
   Current flow at 3 ohm resistor is 4 amps.
   Current flow at both 4 ohm resistors is 3 amps.
   Equivalent resistance is 1 ohm.

3. Total effective resistance (R_T) is 8 ohms.
   Reading at A will be 6 amps.
   No voltage drop will occur.

4. Total effective resistance is 1.2 ohms.
   Reading on the ammeter will be 3.75 amps.
   No voltage drop occurs in parallel circuits.

5. $R_T = \frac{1}{R_1} + \frac{1}{R_2} = 6$ ohms.

   Voltage at E is (10 x 6) = 60 V.

Science Test

UNIT XIV

Student Score: _____/60

NAME: _____

DATE: _____

Exercise 1. (10) Match the word or words in the left-hand column with the correct phrase in the right-hand column.

_____	static electricity	a. due to an excess of electrons
_____	conductor	b. atomic particle with no charge
_____	non-conductor	c. opposition to the flow of electrons in a circuit
_____	electric current	d. particle of the atom that has a positive charge
_____	circuit	e. due to a defficiency of electrons
_____	positive charge	f. a non-moving charge built up on a non-conductor
_____	negative charge	g. measured in units called watts
_____	electron	h. atomic particle that moves from atom to atom
_____	electrical resistance	i. measured by a device called a voltmeter
_____	proton	j. a substance that readily transports electrons along itself
		k. completed path through which a current flows
		l. substance such as glass, dry air and rubber
		m. flow of electrons along a conductor

Exercise 2. (10) Match the word or words in the left-hand column with the correct phrase in the right-hand column.

_____	electromotive force	a.	device used to measure electrical resistance
_____	amperage	b.	the unit of measurement of electrical power
_____	electrical resistance	c.	device that measures e.m.f. in a circuit
_____	volt	d.	unit of measurement of electrical pressure
_____	ohm	e.	a device used to detect an electric charge
_____	ampere	f.	electrical pressure in a circuit
_____	ammeter	g.	current intensity in a circuit
_____	voltmeter	h.	opposition to current flow in a circuit
_____	galvanometer	i.	device to measure current flow
_____	electroscope	j.	device used to measure a weak electric current
		k.	unit of measurement of electrical resistance
		l.	unit of measurement of current intensity
		m.	unit of electrical energy

Exercise 3. (20) Multiple choice. In each of the following, circle the letter preceeding the word or phrase that best completes the statement or answers the question.

1. The negatively charged particles spinning around the nucleus of an atom are the

   a) protons
   b) electrons
   c) neutrons
   d) shells

2. Five 50-ohm lamps connected in parallel would have a combined resistance of

   a) 50 ohms
   b) 55 ohms
   c) 250 ohms
   d) 10 ohms

3. Static electricity might best be compared to

   a) potential energy
   b) chemical energy
   c) kinetic energy
   d) atomic energy

4. If an appliance having a resistance of 20 ohms were plugged into your household current, the rate of current flow would be

   a) 3 amps
   b) 2200 amps
   c) 5.5 amps
   d) 6 amps

5. Which of the following abbreviations stands for an electrical current in which the electrons reverse their directions?

   a) BC
   b) DC
   c) AC
   d) EMF

6. The law of magnetic poles is most similar to the law of:

   a) gravity
   b) electrical charges
   c) inertia
   d) conservation of matter and energy

7. The heating element of a toaster has a resistance of 10 ohms. The amount of current that will flow through this resistance if an e.m.f. of 110 volts is applied is . . .

   a) 10 amps
   b) 11 amps
   c) 110 amps
   d) 1/11 amp

8. What e.m.f., when applied across a resistance of 30 ohms will cause a current of 4 amps to flow in the circuit?

   a) 4/30 volts
   b) 7 1/2 volts
   c) 30 volts
   d) 120 volts

9. What resistance will allow a current of 4 amps to flow if a voltage of 120 volts is applied?

   a) .3 ohms
   b) 30 ohms
   c) 120 ohms
   d) 480 ohms

10. The symbols represent.

a) a resistance and an ammeter

b) a switch and a battery

c) a fuse and a rheostat

d) a resistance and a dry cell

11. What current through a 250 ohm resistor will cause a voltage drop of 75 V across the resistor?

a) .3 amps

b) 3.3 amps

c) 25 amps

d) 187.5 amps

12. An electrical motor draws 6 amperes and is connected to a 120-volt line How much power does it require?

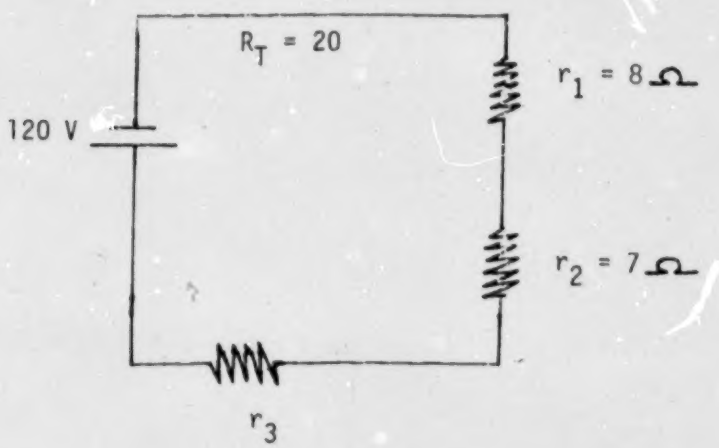
a) 20 watts

b) 120 watts

c) 480 watts

d) 720 watts

The following circuit diagram applies to questions (13), (14) and (15).



13. In the preceeding circuit diagram, the resistance r_3 is . . .

a) 5 ohms

b) 6 ohms

c) 8 ohms

d) 12 ohms

14. The current passing through r_2 in the diagram is . . .

a) the same as that passing through r_1

b) 6 amps

c) constant throughout the circuit

d) described by statements (a), (b) and (c)

15. The voltage drop in the preceeding circuit diagram is . . .

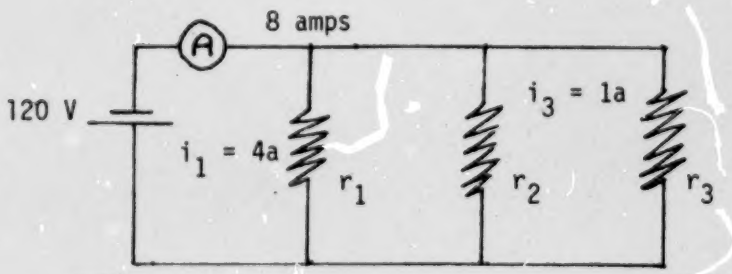
a) 0 volts

b) 6 volts

c) 60 volts

d) 120 volts

The following circuit diagram applies to questions (16) to (20).



16. In the above diagram, the voltage in the circuit . . .

a) is 120

b) is 3

c) is 15

d) cannot be calculated

17. The current passing through r_2 is . . .

a) 8 amps
b) 4 amps
c) 3 amps
d) 1 amp

18. The resistance at r_1 is . . .

a) 15 Ω
b) 30 Ω
c) 40 Ω
d) 120 Ω

19. The resistance at r_3 is . . .

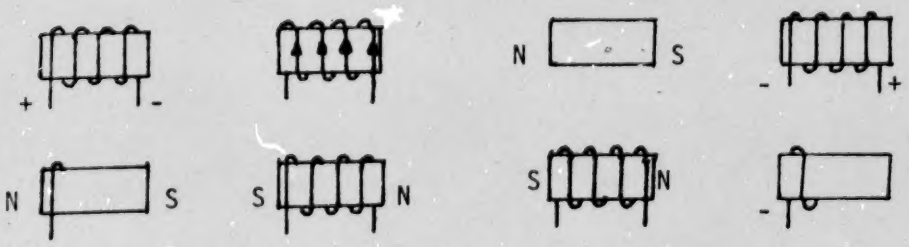
a) 15 Ω
b) 30 Ω
c) 40 Ω
d) 120 Ω

20. The total resistance in the circuit is . . .

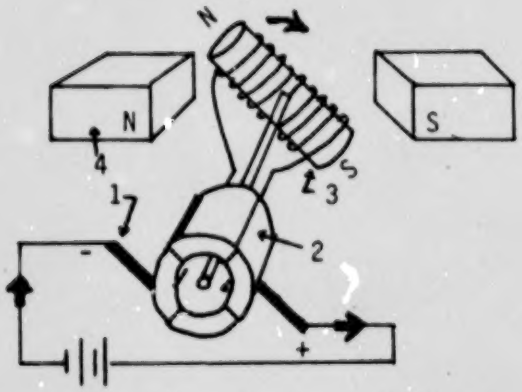
a) 15 Ω
b) 30 Ω
c) 40 Ω
d) 120 Ω

Exercise 4. (20)

1. Here are diagrams of coils showing one of the following; (a) the polarity of the power source, (b) the direction of the current or (c) the magnetic polarity. Complete the diagrams by drawing in the two missing items.



2. Label the given diagram of a simple direct-current motor.



1. _____
2. _____
3. _____
4. _____